

Regional Sectorial Watch

Economic Research Department

July 2009



Dear Reader:

Amidst the great adversity in Mexico's cyclical behavior in 2009, we must pause to reflect on the issues that will define our capacity to recover and take advantage of the opportunities that will emerge once the world economic cycle resumes its course and the financial volatility and aversion to risk that we have seen in recent quarters are reduced to more acceptable levels. One of these matters is infrastructure and I would like to share with you some reflections regarding its importance and the potential it offers in the medium term.

First, in view of its considerable lag, infrastructure is a clear detonator for development in Mexico. In the short term, it attracts investment, generates employment and has a multiplying effect within the economy. But its most important effects are long term, because infrastructure increases productivity and stimulates the creation of new businesses. The experience is eloquent in many countries, including ours, with regard to the difference that is implied when a country has modern and adequate infrastructure. Greater investment in quality infrastructure is a key element toward increasing potential GDP growth in Mexico.

Secondly, infrastructure that is well developed is in itself an attractive business opportunity. With clear rules, transparency in the projects and proper valuation schemes, infrastructure projects can contribute to diversifying risk and can offer, on a long-term horizon, attractive profitability levels for investors. In Mexico, the bases have already been established to stimulate investment in infrastructure through institutional funds, a road that will undoubtedly provide important benefits.

Third, giving priority to the development of infrastructure implies progress in the quality and exercise of public spending. Certainly it must be accompanied by transparency and rules that demand a commitment to the effective rendering of accounts, but investment spending is much more efficient than the government's current expenditures or subsidies, transfers, wages and administrative expenses. The progress that can be made in this matter at the state and municipal levels is certainly significant.

To summarize, infrastructure represents a great opportunity for Mexico; investment in this area will be fundamental, both in emerging from the recession faster as well as ensuring greater, sustainable growth in the medium term. We hope this publication will inspire you, as it has me, to firmly promote its development. Enjoy.

July 2009.

Ignacio Deschamps
Chief Executive Officer and
Chairman of the Board of Directors

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* We appreciate INEGI's collaboration for the information and its analysis

We dedicate this special issue of ***Mexico Regional Sectorial Watch*** to infrastructure, which although it is facing difficult conditions for its full advancement, today more than ever has acquired renewed importance as a lever for development. In the short term, it helps to mitigate the effects of the global recession; in the medium term, it contributes toward increasing potential economic growth. As usual, the focus of the analysis is based on a global vision toward aspects of a local and regional nature; we highlight structural aspects that provide ample support to the development of infrastructure and mention those aspects that limit it in some cases, as a result of the current situation.

In recent years, the factors that stimulate the growth of infrastructure are strengthening. In the emerging countries, these have been, and will continue to be: the population dynamics, its concentration in urban centers, with millions entering the middle class and higher-income levels annually. In the industrialized nations, the challenge is not any less; the updating, modernization and adaptation of the existing infrastructure. In both cases, the use of new technologies of communication and transportation, as well as the globalization process will continue to drive it, and although the substantial drop in international trade will take time in recovering, the trend will continue.

Global financing has become limited and more expensive. This has made it necessary to reconsider or postpone projects but not cancel them. Some governments, such as the United States and China, have chosen to invest in infrastructure as the road to overcome the crisis. Then, there are the private investors, with resources and an interest in financing these projects when conditions of stability in the financial markets are reestablished. Due to its characteristics, infrastructure offers important advantages that make it a special type of asset, offering benefits for long-term portfolios.

In México, infrastructure is viewed by the administration as a route toward development. The results are not yet fully visible and the environment has made it necessary to redefine some projects; but it is also true that it is one of the most productive expenses that can be made. We offer an analysis to determine the degree of advancement, at the sectorial and state level, in addition to an evaluation of the projects that could face fewer difficulties in the short term to materialize.

In this issue, we make an innovative contribution to measure the impact at the sectorial level and on employment, as a result of the investment made in infrastructure through the use of the input-output matrix. The preliminary evaluation is encouraging, especially in terms of generating employment, since it will help to partly compensate those jobs that have been lost in other sectors. There is still much to do in Mexico to promote the development of infrastructure. It is necessary to break various bottlenecks; we will analyze some of these and in some cases will propose elements to eliminate them. The evaluation is conclusive, infrastructure can become a sector with above-average sustained growth for the economy, at least during the next two decades. We must assume a commitment in the country to give it priority, both in the different levels of government as well as in the private sector. It is up to us to facilitate these conditions, in order to achieve a greater level of growth and well-being.

I. Infrastructure, in Mexico and in the World

- Has the international economic and financial crisis stopped the need for investment in infrastructure?
- How advanced is the National Infrastructure Program and how far will it reach?
- Is the strategy of the federal government to invest in infrastructure adequate to counteract the effects of the recession?

Investment in infrastructure today, as never before, occupies a prominent role in the world economic agenda. From the standpoint of the current situation, the global recession is leading many countries to develop anti-cyclical fiscal policies that will allow them to apply the best infrastructure formula for the present times. This must include multiple characteristics, both economic as well as technical. In the first group, infrastructure must not only be complementary as well as a detonator for private investment, but must also maximize the impact on activity in terms of production and employment. In the second group, we find the need of making the best investment for the future, so that it can meet the needs of the population in the best way possible.

In addition, there are structural factors to consider, in the developing countries, such as population growth, concentration in urban areas, attention to lags in social areas, the increase of well-being in some areas and strata of the population. In the industrialized countries, infrastructure must be updated and maintained, the aging population must be attended, the growing concern with regard to climate change and the intensification of globalization. In the developing countries, an effort must be made so that investment in infrastructure will detonate a greater convergence in per capita income, stimulate internal demand and the exporting processes, and strengthen policies to reduce poverty and inequality.

This article analyzes the factors behind the development of infrastructure at a global level. Based on this, it is possible to respond to some of the questions that emerge in the current environment, such as: how vulnerable are the trends in infrastructure investment to the evolution of the lower part of the world economic cycle?; what can we expect for infrastructure once the cycle resumes the upward trend? or which are the key sectors that will emerge in this recovery?

I. Which factors drive the development of infrastructure?

1) Demand in the emerging countries

Economic growth, especially in the emerging countries, is one of the main driving forces for the development of infrastructure at the global level. For example, from 1990 to 2005, the world economy grew at an annual average rate of 2.8%, although in the emerging nations, the rate was higher than 4.5%. During this period, the growth in economic activity has been associated with the expansion of international trade: between 1996 and 2006 the volume of global trade grew at a rate of more than 6%, twice that of world GDP in the same period (WTO, 2007). In the last fifteen years, the evolution of the emerging countries has been notable: its contribution to world exports practically doubled, rising from 20% to 37%; China accounted for half of this increase (World Bank, 2008a).

Greater trade has translated into accelerated movement of cargo. For example, world trade by means of maritime transportation (containers) has recorded annual increases of close to 10% on average in the last 20

years¹. In this period, its share in total movement of international freight (excluding oil and gas) has more than tripled, from 7.4% to 24% of the world total. In Asia, more than 50% of maritime freight is transported and 12 of the 20 ports with the greatest traffic are located there (UNCTAD, 2007, United Nations Conference on Trade and Development).

Cargo movement at port terminals is also closely linked to railroads and highways. From 1980 to 2005, the handling of railroad freight grew four times, from 12.4 billion tons to 50 billion. On the highways, World Bank figures show that between 1990 and 2002, average density, measured in highway kilometers for every thousand square kilometers of surface, grew 20% on a global level, from 186 to 223 kilometers (World Bank 2008b)

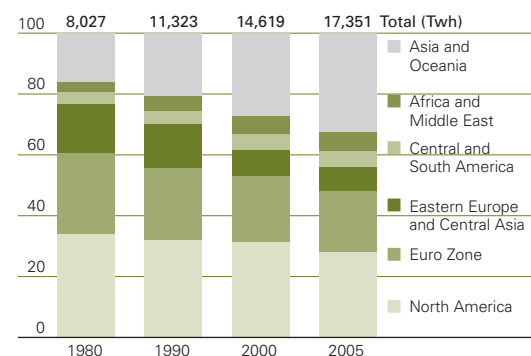
Energy consumption has also shown accelerated growth: from 1980 to 2005, the generation of electricity more than doubled at the world level, from 8 thousand terawatts/hour (Twh), to 17.4 thousand Twh. The main contribution to this growth came from Asia, where consumption per inhabitant grew more than five times, while in Central and South America, it grew three times. The advances in access to potable water and drainage have been equally significant. Starting in the nineteen eighties, coordinated efforts were made at the international level to raise the quality and coverage of water services, especially in the developing countries². The result was that, by the end of the twentieth century, two billion persons at world level had access for the first time to potable water and 1.5 billion to drainage. Still pending attention are around 2.4 billion inhabitants—80% of these in rural areas—which represent 36% of the total world population (OECD, 2006).

Is there anything that can significantly change medium-term demand in the emerging countries? In the short term, the global recession could curb these trends (although a generalized trend is observed to boost infrastructure through public spending), although not in the medium or long term. This could even contribute to coming out of the recession faster. The population dynamics alone is an important source of pressure to boost recovery of the growth rate to that prior to the global crisis. For example: the population growth rate in the developing countries will be maintained in a sustained manner at more than double the expected growth rate in the industrialized nations (1.1% vs. 0.4% annually) up to 2030. This population growth is concentrated mainly in the urban areas, generating strong pressure on infrastructure of services in the cities (potable water, drainage, electricity, schools, hospitals, etc.). World Bank projections for population growth at the world level indicate that it will increase 26% between 2005 and 2030 (from 6.4 billion to 8.1 billion inhabitants), and 60% of these will live in cities, whereas at the present time, the figure is 40%.

It is not clear that the economic slowdown in the industrialized world will stop trade suddenly and in a prolonged manner: China, which

Generation of Electricity Doubled in 25 Years

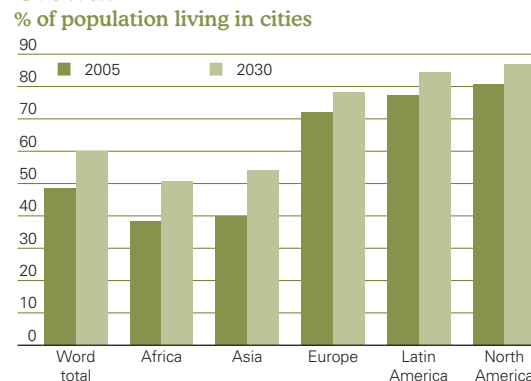
% share



Source: BBVA Bancomer with U.S. Department of Energy data

Cities Must Absorb the Population Growth

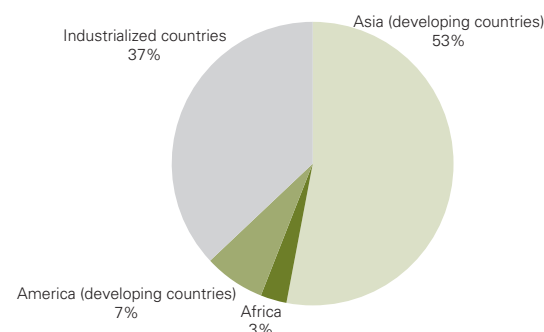
% of population living in cities



Source: BBVA Bancomer with OECD data

The Emerging Countries Control Maritime Trade

World movement of container cargo, % share



Source: BBVA Bancomer with UNCTAD* data (*United Nations Conference on Trade and Development)

¹ This growth implied that international movement of containers has multiplied five times in the period of reference: from 200 million TEUs (cargo equivalent to 24-foot containers) in 1985 to more than one billion in 2006. .

² The initiative was promoted by the United Nations Organization, which establishes objectives and priorities on the subject and also declared the eighties as "The water decade".

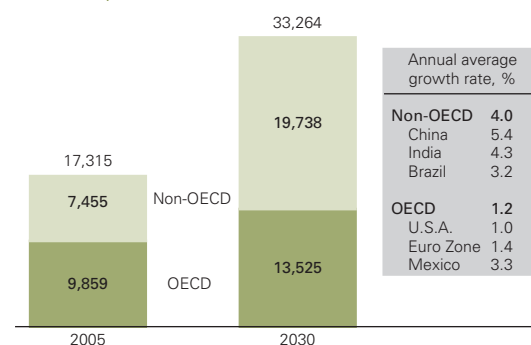
Maritime Terminals Consolidate Share in Cargo Transported Worldwide, 2006

	Country of Origin	%
Hutchinson Port Holdings	Hong Kong, China	13.0
PSA International	Singapore	10.7
APM Terminals	Netherlands	11.8
DP World	U. Arab Emirates	9.4
Cosco Pacific	China	5.0
Eurogate	Germany	2.7
Evergreen	Taiwan, China	2.1
MSC	Switzerland	2.0
SSA Marine	United States	1.7
HHLA	Germany	1.5
Accumulated Share		59.9
Total cargo movement		440
(Millions TEUs)		

Source: BBVA Bancomer with UNCTAD data (United Nations Conference on Trade and Development)

How much will Electricity Demand Grow in the World?

Terawatts/hour



Source: BBVA Bancomer with U.S. Department of Energy data

Closing the Infrastructure Gap Will not be Easy

How much must be allocated?, % of GDP

	BRICs*	N-11**
Total	221.6	58.9
Basic telephony	6.5	1.3
Mobile telephony	7.1	1.2
Electricity	169.7	28.2
Railroads	38.3	0.9
Highways	na	27.3

* BRICs to reach G6 level
 ** N-11 to reach BRICs level

Source: BBVA Bancomer with Goldman Sachs data

ranks third in terms of exports at the world level, places 60% of its sales in markets other than the United States and the European Union. Thus, in terms of maritime transport, which accounts for more than 70% of world trade, freight handling will continue to grow, perhaps at lower rates, but still significant. It is estimated that toward the year 2012, the use of terminals for containers will have reached 90%, from levels of 72% in 2006 (Morgan Stanley, 2006), generating symptoms of a certain saturation. The current recession could partially delay these dates, but again, a radical and permanent change in these trends appears difficult.

In airports, estimates of Airports Council International warn that air traffic will more than double over the next two decades, from 4.8 billion passengers in 2007 to 11 billion in 2027. This organization estimates that, before 2025, Asia will have surpassed North America, both in terms of cargo and passenger movement. Beijing, for example, is now among the first ten airports in the world, while in 2000 it was not even among the first 30. In terms of cargo, Shanghai and Dubai rank 6 and 17, respectively, while in 2000 neither of the two were among the 30 most important (ACI, 2008).

In electricity, estimates of the Department of Energy of the United States anticipate that demand will double in 2030 compared with its levels in 2005, from 17,300 Twh to 33,300 Twh. The increase will come mainly from the emerging economies, where it is estimated that almost one third of the population (around 1.6 trillion persons) lack this service, and demand growth will be around 4% annually. The same projections warn that toward 2030, the emerging economies will consume almost 50% more electricity than the member countries of the OECD, whereas in 2005, their consumption was 24% lower (EIA, 2008, Energy Information Administration).

In water, the goal of the United Nations is to reduce by half the population that lacks potable water and drainage services toward 2015. With this, more than 90% of the growth in demand for water for residential consumption will come from the developing countries (Dieterich, 2003).

How much should the developing countries dedicate to catch up with the developed world? According to estimates of Goldman Sachs, the BRICs (the block of high-growth countries comprised of Brazil, Russia, India and China) must invest more than two times their GDP value (along the order of 4.5 trillion dollars in 2005) to reach the current infrastructure levels of the industrialized nations (based on a comparison with the members of the G6)³, which, in terms of the growth rates observed, would take around 25 years. For the group of countries behind the BRICs, the N-11⁴, which includes Mexico, reaching the infrastructure level of the BRICs would imply investments along the order of 1.7 trillion dollars (60% of 2005 GDP), which could be achieved in a period between 10 and 15 years (Goldman Sachs, 2006).

3 Germany, the United States, France, Italy, Japan, United Kingdom

4 The N-11 ("next eleven") is comprised of Bangladesh, Korea, Egypt, Philippines, Indonesia, Iran, Pakistan, México, Nigeria, Turkey and Vietnam.

China is leading in this area, since it currently invests amounts equivalent to 9% of GDP in infrastructure, compared with an average of 2% invested by the developing countries (Pavoni, 2008). In fact, this figure is within the range of what the World Bank considers to be the amounts required for the developing nations to update in terms of infrastructure, 7% to 9% (Fay, 2004). Measured in current amounts, the investment gap is equivalent to figures along the order of US\$300 billion annually.

2) The industrialized nations update

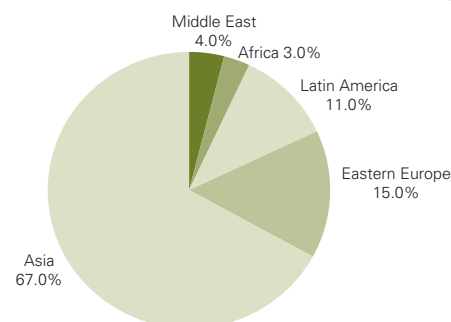
While in the emerging countries, the demand for infrastructure implies developing new projects, in the industrialized nations, the needs are focused on updating and modernizing the existing structure; and it is no minor challenge. The fall of a bridge in Minnesota in 2007, which among other factors, was due to a lack of maintenance, is one sign that investment in infrastructure can be very significant. Other examples include the project to replace the potable water distribution line in order to control leaks, as well as the renovation of the Chicago mass transportation system by 2016, the date of the Olympic Games in that city (U.S. Global Investors, 2007).

The projections of the Department of Energy of the United States indicate that in 2030, the generation of electricity in the member countries of the OECD will increase close to 40% compared to its levels in 2005. The OECD estimates that the investment required to meet the rise in demand, at the same time that plants that are nearing the end of their useful life will have to be replaced, will increase from around US\$40 billion in 2005, to close to US\$90 billion annually toward 2025. In highways, annual investment will grow from US\$100 billion annually in 2005, to US\$175 billion in 2030. In water, the amount of investments will increase by around 50%, from US\$400 billion to US\$600 billion between 2005 and 2025. Viewed overall, the investments in infrastructure required annually by the developed countries will be equivalent to close to 2% of world GDP (OECD, 2008).

Can an environment of global downturn permanently curb investments in infrastructure in the industrialized nations? Not necessarily. It is true that lower growth implies fewer tax resources and consequently a lower budget for public works. But the public works budget is not everything. As specified in the article on financing, investment in infrastructure is attractive because of its return, stability in the flows, as well as because, in general, this type of project has no competition. Moreover, the world economic recession does not modify infrastructure needs; if anything, it lessens the urgency of investment in some areas. The OECD identifies spending in infrastructure as one of the most promising strategies to overcome the current crisis (OECD 2009). The United States and China are betting strongly on infrastructure as the lever to boost economic activity: the former with an investment program of US\$150 billion in renewable energy over a 10-year period, and US\$60 billion for highways and other projects, China, even more ambitious, will allocate US\$600 billion to contribute to the modernization of the rural area of the country, to be exercised between 2009 and 2020.

Where will Infrastructure Investment be Assigned In the Next Decade among Emerging Countries?

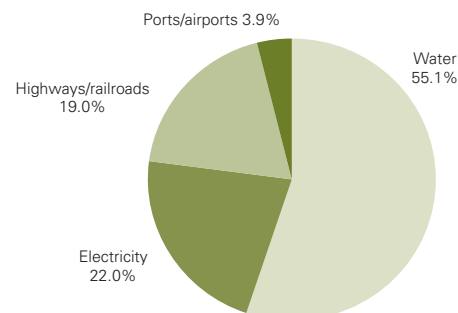
Middle East Africa Latin America Eastern Europe Asia



Source: BBVA Bancomer with Morgan Stanley data

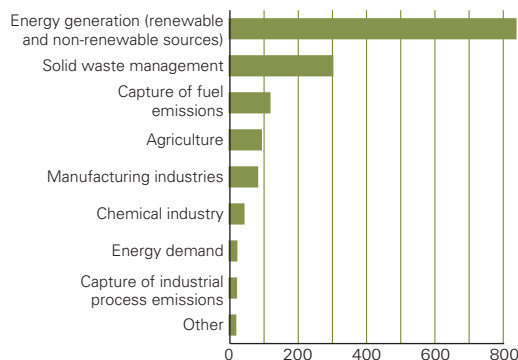
What Sectors will Require Greater Investment Amounts?

Accumulated flows, total worldwide, 2005-2030



Source: BBVA Bancomer with U.S. Global Investors data

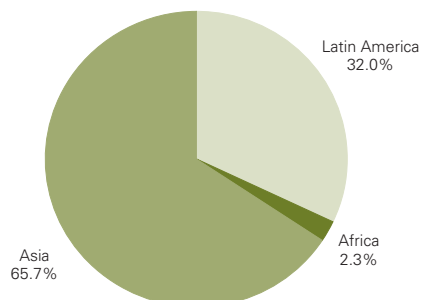
What are the Most Important Environmental Programs? Projects registered in the United Nations CDM program



Source: BBVA Bancomer with United Nations data

Where are the Environmental Projects Located?

% share, United Nations CDM program



Source: BBVA Bancomer with United Nations data

3) Environmental pressure

Climate change, together with the need of finding alternate (price-efficient) energy sources other than oil, are important elements in promoting investment in infrastructure based on non-contaminating technologies. Among the elements that determine the speed of these investments are the price of conventional energy sources, technology that lowers the price in some cases of non-contaminating energy sources and measures that lead to change, such as environmental policy, regulation and public subsidies.

With regard to environmental policy, there is, for example, the Kyoto Protocol, which requires lowering the levels of greenhouse gas emissions by the industrialized nations in the period from 2008 to 2012 to 5% below those of 1990. There are also high environmental standards in the European Union⁵ and the goals it established in 2008 to reduce carbon emissions and the share of renewable energy products in total energy generated by 2020⁶.

Legislation can also make an important difference in the productivity of infrastructure projects. Thus, for example, if the government makes a commitment to acquire totally or partially the energy generated from renewable sources, the risk of demand is eliminated and the appeal of the project⁷ increases. This becomes particularly important in the case of renewable energy, where the technology requires a certain degree of maturity to compete with fossil fuel sources. For example, while the cost per kilowatt/hour (Kwh) in the case of solar energy could be in the range of 14 to 15 cents, gas or carbon plants can produce it in ranges between 5 and 7 cents (Jackson, 2008).

Finally, there is the development of the carbon emissions market, which consists in commercializing internationally the benefits of producing energy based on non-contaminant technologies. Under this scheme, clean energy projects generate "certificates of emission reduction" that can be sold to those companies or countries that require them to vouch for compliance of their goals in this matter. Most of the projects under this scheme that the World Bank has denominated as a Clean Development Mechanism (CDM) are carried out in developing countries, with investments of close to US\$6 billion in 2006, practically three times the investment of multilateral organizations in clean energy projects, based on a comparison among the same group of countries (UNCTAD 2008, United Nations Conference on Trade and Development)⁸.

5 The World Bank estimated that membership in the European Union would require annual investment flows by the Eastern European countries of US\$2.5 trillion until 2015.

6 In some cases, local legislation has begun to adapt to the new requirements, as in Germany, which at the end of 2007 approved a law that legally binds incorporating heating systems based on renewable energy in all buildings constructed as of 2009.

7 Spain is a good example, since it combines ambitious goals to generate energy from renewable sources, offers certainty in the rates at which the government buys for up to 25 years and also guarantees the purchase of all the energy generated through renewable sources.

8 Review Mexico Real Estate Watch (Situación Inmobiliaria México), of the month of January 2009 which analyzes the development and potential of the carbon bonds market.

On a medium-term perspective, environmental care will continue to exert pressure for the development of infrastructure based on clean technologies, although its strength will depend on factors that in some cases are still pending definition. For example, the United States, which is the greatest generator in the world of greenhouse gas emissions, has not ratified its commitments to the Kyoto Protocol with regard to emission reduction (and will probably not do so). Moreover, there is still no international agreement with regard to what will be done as of 2013 when the commitments established in the Protocol expire. In the end, the definition regarding this topic is key in the perspectives for the development of environmental projects in the developing countries.

The price of oil and, in general, of conventional energy sources, also have an effect on the development of environmental projects: the higher the prices, the greater the incentive to develop technologies based on renewable energy. In the short term, the environment of global economic slowdown, which tends to reduce the prices of raw materials—among these oil—could imply some moderation in the growth of environmental infrastructure. However, in the medium term, the pressures to find reliable and efficient energy sources in terms of cost that will replace oil will continue to be present and should not be underestimated; they could represent at the present time, a trend that is not yet generalized, but technological innovation and greater environmental commitments are sufficient elements to monitor them, since they could emerge as a sustainable and accessible alternative for vast population groups.

4) The telecommunications revolution

It is not an exaggeration to say that in recent decades, information and communication technologies have transformed the world. As of 1980, there have been major advances in this industry, all with strong implications for the global economy: privatizations of fixed telephony companies, the emergence of the Internet and mobile telephony.

Although the industrialized countries have made great progress in the development of telecommunications, there have also been significant advances in the emerging countries. While in 1980 only 20% of the telephone lines were located in the developing countries, by 2005 the proportion had grown to 60%. For the Latin America region, subscribers of fixed and mobile telephone services had grown from levels of 6 for every thousand inhabitants in 1990 to 72 in 2006; that is, the penetration multiplied eleven times. In Mexico, this indicator grew ten times, from 7 to 74.

A key element in the development of telecommunications has been the reform of the regulatory framework, to motivate, through the liberalization of the market, the entry of new participants and promote competition. Figures from the World Bank reveal that, among 30 nations in Africa and Latin America that carried out reforms in the telecommunications sector, those that introduced programs to promote competition posted the greatest growth in the industry and a clear downward trend in costs for users (World Bank, 2006).

The liberalization of the industry, in turn, has also served as a catalyst for investment in the sector. In 2006, among the 50 most important

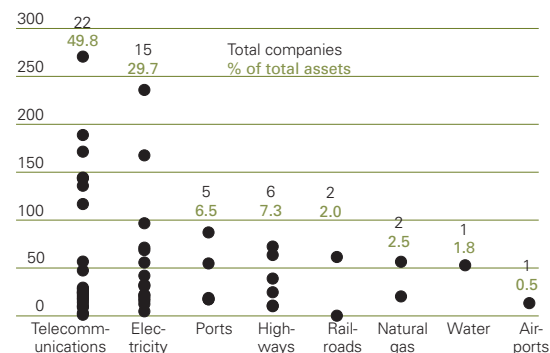
Communications Development: A Global Phenomenon

	Telephony		Internet**	
	1990	2006	1990	2007
Asia – Pacific	0.8	57.4	0.0	14.4
Eastern Europe	12.5	110.6	0.0	25.8
Central Asia				
Euro Zone	41.0	158.6	0.1	51.5
OECD countries (high income)	46.4	144.3	0.3	65.5
Latin America and the Caribbean	6.0	72.1	0.0	23.7
Mexico	7.0	74.0	0.0	22.0

* Fixed and mobile telephony subscribers, per 100 inhabitants
 ** Internet users (per 100 inhabitants)
 Source: BBVA Bancomer with World Bank data

In Infrastructure, the Greatest Value is in Telecommunications

The 50 main multinationals in infrastructure in 2006, Asset value in trillions of dollars



Source: BBVA Bancomer with UNCTAD data

multinational companies worldwide engaged in infrastructure, 22 were in the telecommunications sector, and the value of their assets, around US\$1.5 trillion, represented nearly 50% of the total, along the order of US\$3 trillion (UNCTAD, 2008).

How strong is the growth trend in the telecommunications industry at the global level? In China and India alone, new mobile telephone users during the last decade are in the hundreds of millions and currently also, new users total millions each month. In India, for example, where the penetration of telephony (fixed and mobile) among the population is under 20%, new users of mobile telephone networks total between five and six million monthly (Deloitte, 2007).

Technology is playing a decisive role, with the development of wireless networks, wide band, greater channels for the transmission of information (TV, telephone, computers, computer games, etc.) as well as convergence (voice, data and video in the same frequency). The challenge will be to expand coverage of the wide band, that allows for the distribution of a greater amount of content. It is estimated that in 2007, only 5% of the population had access to a wide band connection: by 2010 the proportion could be 25% (Deloitte, 2007). In any case, the potential for coverage of this market is still extensive. Progress will be marked by regulation, rates and distribution costs; in other words, the growth of telecommunications infrastructure appears to depend more on factors within the industry itself rather than on the trends in the global economic cycle.

Conclusions: infrastructure, important at any moment, both in times of crisis as well as without

The needs, in terms of infrastructure at the global level have multiplied in the last quarter of a century, and will continue to do so once the world economic growth cycle recovers. The OECD estimates that resources equivalent to between 2.5% and 3.5% of world GDP must be destined to build new basic infrastructure and update existing infrastructure; in the developed countries, the amounts could be around 2%, but in the emerging economies the figure could be up to 9% of GDP.

The emerging countries will guide the creation of infrastructure due to factors that include population growth—and its concentration in urban areas—, greater purchasing power, globalization, compliance with environmental standards, as well as technological development, among others. Updating in this area is the most promising route available to the emerging countries to close the gap with the developed world in terms of growth and well-being. By maintaining the rhythm of recent years, the BRICs (Brazil, Russia, India and China) could reach the current infrastructure levels of the industrialized countries by 2030. The following group of emerging nations—where Mexico is included—could reach the current level of the BRICs in 2020.

In some sectors, such as telephony, the demand generated in the emerging countries already surpasses that of the industrialized nations, and in others, such as electricity, this will occur within a horizon of less than ten years. Furthermore, a proportion greater than 50% of world trade is already being carried out among emerging

countries. In this sense, the impact for infrastructure in a period of global recession could lead to certain delays in projects, but it seems complicated that the trends would change radically in a permanent way; the structural factors seem to be sufficiently strong to avoid a drastic change in the trends that have formed in recent decades. Moreover, the fiscal stimulus and economic recovery programs must necessarily consider investment in infrastructure as part of the economic strategy, which could make them part of the solution to the current crisis; thereby its importance in the short term, without forgetting its medium- and long-term importance in terms of generating quality infrastructure that satisfies the needs of the population in the best manner available.

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Emblematic Projects on a Global Level

On a worldwide level, the variety of infrastructure projects is extensive and demonstrates the medium-term opportunities that are opening up in this important sector. In the past few decades there has been a boom in finding solutions that are better, more innovative, and are carried out more efficiently. An increasing more ambitious vision exists with a view to better satisfying the needs of the population and that at the same time, represent a “viable” opportunity from an economic and financial standpoint for implementing work projects in all sectors, both in the developed world as well as in the emerging economies. In this context, there are projects that are “emblematic”, due to their size and scope, their technical or financial requirements, or as a result of the advantages that they offer. From multimodal transport and shipping networks to futurist cities, the following sections present some of the most ambitious projects in the field of infrastructure.

Emblematic Projects

Project	Characteristics	Beginning of operations	Investment (bill. \$)
Trans-European Transport Network (Ten-T)	A transport network designed to facilitate and improve passenger and cargo traffic to connect the entire European Union. It will include 89,500 kilometers of highways, 94,000 kilometers of railroad track (20,000 of which will be high-speed, up to 200 kilometers per hour, for passenger traffic), 11,250 kilometers of navigable rivers, and 366 airports.	2020	520
Six economical cities in Saudi Arabia	The objective is to create a pole of economic activity, particularly in the development of industrial activities, which would allow for the creation of one million jobs.	2008 (The 1a. country)	170
Highway development program in India	The goal of this program is to build 31,755 kilometers of highways in seven stages in a 20-year period.	2015	71
High-speed train in California	A 1,500-kilometer railway network, handling speeds of 320 kilometers per hour. It is expected to transport between 90 million and 120 million passengers annually.	2020	40
Masdar City / Zero-carbon, in Abu Dhabi	A carbon-emission- and garbage-free city is what is projected for the Masdar district in Abu Dhabi, based on available technologies such as the capture and storage of carbon particles, biofuels, and solar energy. The project, which is being developed in an area of 6.5 square kilometers, is expected to house 1,500 companies and 50,000 inhabitants.	2016	22
English Channel Tunnel, France and the UK	A, 50.5 kilometer-long high-speed underwater railway line, 40 meters underneath the sea, will connect France with the United Kingdom.	1994	15
Itapú Dam, Paraguay	The world's largest hydroelectric dam. It is located on the border between Brazil and Paraguay, and is 7.7 kilometers long. It has 18 power generators and a total capacity of 14,000 megawatts.	1984	14
Trent Mesa Wind-Power Project, Texas	With a capacity of four gigawatts, this project, located in Texas, will be the most important in wind energy in the world, producing the equivalent of one to two nuclear plants, enough to provide electric power to a million homes.	na	10
Panama Canal Expansion	The growth in maritime traffic and the trend toward increasingly larger ships (transporting between 5,000 and 10,000 containers) has led to a certain obsolescence of the Panama Canal, which does not have the technical specifications to allow the new ships to pass through. The project will allow for increasing cargo capacity, from 330 million to 508 million tons.	2014	6
BTC pipeline network, Eastern Europe	The Baku-Tbilisi-Ceyhan (BTC) project will consist of a network of pipelines that will span three countries—Azerbaijan, Georgia and Turkey—to move oil from the Caspian Sea to the Mediterranean Sea without requiring tankers to cross the Black Sea.	2005	4

Source: see References

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How Much does the Gap and Inefficiency in Infrastructure

It is clear that on a world level, in the past few decades important advances have been made in infrastructure. However, the gap between the wealthy countries and the emerging economies is still considerable. Indicators such as electricity consumption, for example, which is six times higher in the high-income countries than in Latin America or the Asia-Pacific region, reflect these differences.

Estimates made by the World Bank indicate that the lack of sufficient and/or competitive infrastructure forces companies in the developing countries to maintain inventory levels that are from two to five times higher than in the industrialized nations. In addition, logistics costs (shipping, storage, inventory financing, distribution, etc.) represent 35% of total expenditures in the manufacturing sector in the Latin America countries, compared with 20% in the OECD member nations (Fay, 2004).

Sectoral estimates in the case of Mexico show that, by reducing logistics costs by 12%, the response in terms of greater demand would be 9% in agro-industry, 10% in furniture and wood products, and 12% in the leather and footwear industry. Furthermore, the figures reveal that in Latin America, the percentage of primary sector products that do not reach the market is up to 25%, compared to 3% in OECD countries (Guasch, 2008). Comparative studies between countries show that the response in raw material inventories to a weakening in infrastructure quality equivalent to a standard deviation in relation to the international average is between 11% and 37% (Guasch and Kogan, 2003).

It is estimated that in terms of its quality, infrastructure in Latin America is 26% less efficient than in the industrialized countries. The disparities among the countries of the region are considerable: while in Argentina it is estimated that 80% of the nation's

highways are considered to be in good condition, the corresponding figure does not reach 25% in countries such as Brazil, Peru, Mexico, and Nicaragua (Vellutini, 2008).

A recent study undertaken by the World Bank to measure the impact of the quality of public services on companies' operating costs revealed that the potential savings of eliminating electric power outages could be from 0.5% to up to 6% of GDP. Meanwhile, eliminating interruptions in the supply of running water could generate savings equivalent to between 0.5% and 3% of GDP.

Other estimates indicate that potential growth in the Latin America countries could increase by as much as 2.6 percentage points if their infrastructure (in terms of quantity and quality) were brought up to levels comparable to the best in the region, and up to 4 points if it were on a par with the average of the Southeast Asian nations (Guasch, 2008).

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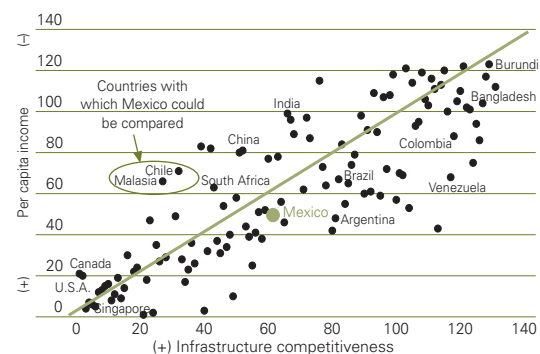
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How Competitive Could Mexico Be in Infrastructure?

Per capita income vs. competitiveness
Infrastructure, world ranking, 2007



* Purchasing Power Parity Method
 ** Countries with per capita income comparable to Mexico and greater competitiveness in infrastructure
 Source: BBVA Bancomer with World Economic Forum and World Bank data.

Investment in infrastructure has been the banner of the federal government during the current administration as a strategy to promote, competitiveness first, and more recently, as a policy to counteract the effects of the global recession. However, although promissory, the National Infrastructure Program (NIP) has up to now shown only limited progress. In addition to complex regulations and the presence of other bottlenecks, a complicated situation has been added: a high level of aversion to risk, the result of the economic crisis and the global recession, has postponed the execution or cut short the scope of diverse important projects.

Within this context, extensive questions arise: How ambitious was the NIP? What can its most probable scope be? What is limiting it? Can the restrictions be easily eliminated? These are some of the issues that will be analyzed in this article, together with a detailed review of its progress up to now, both at a sectorial level and by state.

Weakness, the point of departure of the NIP

The initial point of departure of the NIP is the lag being faced by Mexico with regard to infrastructure, both in terms of coverage and quality, which places the country in a clearly inferior position to the average of the OECD and, in some cases, also compared to that of countries with similar or even lower income. Thus, for example, among the group of countries which, according to the World Bank classification, are in the category of medium-high income and to which Mexico belongs, the proportion of the population with drainage is along the order of 85% and subscribers to telephone lines (fixed and mobile) represent close to 90%. In Mexico the proportion in the former case barely comes to 80% and in the latter, it is 62%¹.

Where should Mexico be positioned as to infrastructure? At least, in a position that reflects its per capita income. According to the ranking in infrastructure competitiveness of the World Economic Forum, Mexico ranks 61 among a group of 131 countries. However, in its per capita income measured through the purchasing power parity method, its position is number 50. That is, the country should progress by at least eleven places that are comparable to its income level. However, the goal could be more ambitious, perhaps seeking to reach Malaysia in position 47 in terms of income and 23 in infrastructure, or maybe Chile, which with a similar income level (position 49 in the global ranking), is in position 31 in terms of infrastructure.

Another weak aspect of the starting point is the fact that this broad lag implies that, due to having stopped investing significantly in recent decades, the country does not have the experience or the capacity to immediately absorb large infrastructure projects. Further on, this will be specified, but it is necessary to eliminate restrictions and reduce the costs of learning so as to implement the National Infrastructure Program successfully.

¹ World Bank. Infrastructure database.

Consequently, the goals are ambitious

According to what could be aspired to, upon announcing the NIP, the federal government set the goal of reaching 2012 positioning Mexico among the first 20% of the world ranking in infrastructure; that is, among the first 30 positions. Achieving this goal implied increasing investment spending, as a share of GDP, from 3.2% that it had averaged in the past ten years to a minimum of 4%². Of course, from the beginning, it was clearly expressed that the government could not finance the projects alone: of the investment amount originally proposed of P\$2.5 trillion, at least one fifth should come from private sector sources.

... and have not been free of obstacles

Setting the goals and the route was easy; meeting them is another thing. In the legal sphere alone, several and complex obstacles had to be overcome, which, in many cases, are difficult to remove and imply changes of a diverse nature, from daily practices to important constitutional changes. On more than one occasion, projects have been placed for bidding without having the permits from the government agencies involved (like the demonstrations of environmental impact) or even more serious, without the legal certainty with regard to the land upon which the projects are to be built³.

There is clear recognition of the obsolescence of legislation with regard to contracting, which constitutes one of the major obstacles that must be overcome: excess internal regulations and bidding requirements, the complexity of contractual agreements and even inadequate interpretation of the legislation on the part of public servants that delay, raise the expense and complicate the development of the projects⁴. In view of this, the need was obvious for eliminating the bottlenecks related with the legal framework and, fortunately, the respective legislation is being adapted, including the Law for Public Works and Services, that of Acquisitions, that of Administrative Responsibilities and the Federal Penal Code (see article on public-private associations in Mexico).

A second factor that has delayed the execution of the NIP is related to limitations of an institutional order. It is no secret that, except for electricity and highways, investment in infrastructure remained stagnant for several years and, as a result, no specialized units exist in governmental agencies—nor in the private sector—that are in charge of not only evaluating the various proposals from a technical standpoint but also of providing efficient follow-up to the enormous amount of projects derived from the NIP.

The NIP in Figures

Billions of pesos

	Pub.	Priv.	Tot.	% Share	GDP%*
Total	1,978	—	2,532	100.0	17.8
Hydrocarbons	1,201	—	1,201	47.4	9.9
Exploration	822	—	822	32.5	6.8
Refining	305	—	305	12.0	2.5
Gas	46	—	46	1.8	0.4
Petrochemicals	28	—	28	1.1	0.2
Non-Hydrocarbons	777	554	1,331	52.6	7.9
Electricity	380	—	380	15.0	3.1
Highways	159	128	287	11.3	2.4
Telecommunications	19	264	283	11.2	2.3
Ports	16	55	71	2.8	0.6
Airports	32	27	59	2.3	0.5
Railroads	27	22	49	1.9	0.4
Potable water and sewage	108	46	154	6.1	1.3
Hydro-Agricultural	36	12	48	1.9	0.4

* 2007 nominal GDP is taken as a reference
Source: BBVA Bancomer with Finance Ministry (SHCP) and INEGI

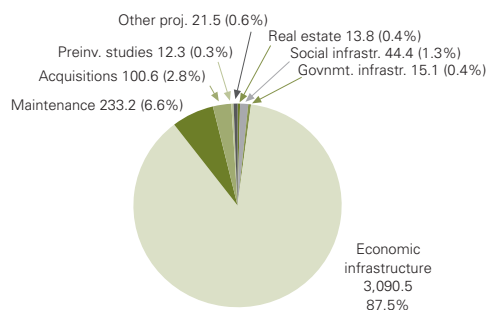
2 The 3% to 4.5% range was proposed as a base scenario; the optimist placed the figure between 4.5% and 6%; for its part, the inertial scenario implied amounts equivalent to between 2% and 3% of GDP.

3 The headquarters for the construction of the new Pemex refinery, announced at the beginning of April, is a good example. The decision was made without defining specifically the land or the certainty as to the ownership.

4 The Federal Commission of Regulatory Improvement (Comisión Federal de Mejora Regulatoria). Presentation of motives in the bill with a project for decree by which several provisions of the Law on Acquisitions, Leasing and Services of the Public Sector are reformed, added to and repealed, as are the Law on Public Works and Services Related to the above, the Law on Federal Administrative Responsibilities of Public Servants and the Federal Penal Code March 2009.

What is in the Federal Government Project Portfolio?

Billions of pesos and relative share



Source : BBVA Bancomer with Finance Ministry (SHCP) data

Which Sectors Concentrate the Infrastructure Projects*?

Projects, amount and relative share

	Proj.	Inv ¹	% Share	GDP % ²
Total	2,297	3,129	100.0	25.8
Hydrocarbons	150	2,823	90.2	23.3
Exploration	26	2,550	81.5	21.1
Refining	51	203	6.5	1.7
Petrochemicals	41	49	1.6	0.4
Gas	32	21	0.7	0.2
Non-Hydrocarbons	2,147	306	9.8	2.5
Highways	1,482	167	5.3	1.4
Electricity	138	75	2.4	0.6
Water	289	39	1.2	0.3
Ports	220	22	0.7	0.2
Airports	4	3	0.1	0.0
Railroads	14	1	0.0	0.0

* Economic infrastructure promoted by the federal government

1 Investment, Billions of pesos

2 2007 nominal GDP is used as a reference

Source: BBVA Bancomer with Finance Ministry (SHCP) data

As if something were missing from the internal limitations, the international financial crisis emerged, as did the subsequent peso depreciation, which in addition to making the projects, in some cases, more expensive by up to 30% to 40%, severely limited access to international financing. Thus, for example, the bidding for the second highway package, under the plan of asset development programmed for the beginning of 2009, was declared cancelled and had to shorten its scope to attract potential investors. Another example is Punta Colonet, one of the most ambitious projects of the NIP for an investment amount of P\$50 billion. Its bidding had to be postponed on two occasions, awaiting for financial stability to allow for the execution of the project. Should there be no additional delays⁵, the winner could be announced in August of this year and the project could initiate operations in 2013 or 2014.

How much have the infrastructure projects progressed?

There is a generalized perception that the NIP has been lagging somewhat as regards the goals and the time spans that the federal government had initially set. It is difficult to specify the magnitude of this lag, although, as of the investment projects portfolio registered before the Ministry of Finance (SHCP), a panorama can be obtained as to which sectors have progressed the most and in what states.

The above-mentioned portfolio is composed of economic infrastructure projects (communications and transportation, energy, hydrocarbons and hydraulic projects), social (parks, hospitals, schools, etc.) and governmental. It also includes projects that include real estate acquisitions, maintenance works, furniture and equipment acquisitions, as well as pre-investment studies.

The investment registered in the project portfolio corresponding to the public sector⁶ is of P\$3.7 trillion, of which 88% corresponds to economic infrastructure (P\$3.1 trillion)⁷. The information on the projects presents a high level of detail, including name and description, the investment amount budgeted per year (performed and pending realization), and its current status, that is, if it is in force or is in the process of modification or cancellation. Thus, this list serves as an approximation to measure the progress made by the NIP up to now⁸, with reference to federal investment. Not included in the data base are the PPS projects, being that the associated resources are registered as current expenditures and not as an investment.

5 Additional delays are not ruled out, since the project is subject to international maritime traffic, which, in the current context, has been highly deteriorated.

6 In the project portfolio. It is not specified whether the project will be realized only with public resources or if it will include the participation of the private sector. In any case, the participation of the latter is not included in the database. This has its implications: for example, in the case of highways where the concession projects under the asset development plan are not included.

7 Included in the portfolio are most of the projects contained in the NIP that imply federal investment. However, some important ones are excluded; for example, the multi-modal transportation Punta Colonet project and the Riviera Maya airport are catalogued as pre-investment studies. Also there are projects that do not appear, such as that of Line 12 of the DF metro (the Mexico City subway). On the other hand, it is important to note that the amounts and the projects proposed in the data base do not exactly correspond to those originally proposed in the NIP, due to the fact that some of them have been included or updated throughout the last two years.

8 For purpose of this analysis, the cut was done in the first week of April.

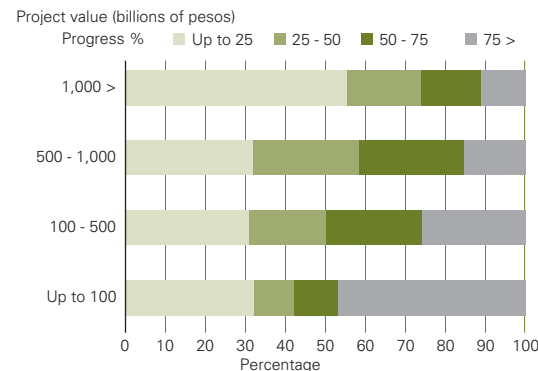
If measured by the investment amount to be realized, the projects related to hydrocarbons (exploration and oil, natural gas, refining and petrochemical production) represent close to 90% of the economic infrastructure, or around P\$2.7 trillion. The remaining 10% is divided among highways (5%), electricity (2%), water (1%) and ports, airports and railroads (1%). It should be mentioned that the investment amount has nothing to do with the number of projects: for example, hydrocarbons represent only 8% of the total, while highways are close to 70%.

Notwithstanding the above, one way to measure the execution of the NIP in general terms is through the ratio between the investment performed, compared to the investment pending of each project.⁹ The degree of progress presents important differences among the sectors and a distinction should be made between those related to hydrocarbons and the rest. Thus, for example, those most advanced—measured as of the investment made in 2007 and 2008 compared to that programmed for the years 2007 and subsequent ones—are the electricity projects with 46%; the highways¹⁰ in second place with 43% progress, followed by water works (potable water, sewage, and water treatment) and ports, with almost one-third progress. In airports, progress is about 20% and, in railroads, the figures suggest progress of up to 70%¹¹.

The hydrocarbon projects, overall, have progressed barely 5%, even though here there are also important differences: while in gas progress is 12%; in oil exploration and production it is 4%. What is relevant is that precisely this last activity is the one that concentrates 82% of the NIP value or P\$2.5 trillion of the P\$3.1 trillion of the total investment¹². Thus, the relative weight of hydrocarbons in the total investment of the NIP shows that in the aggregate balance, the program appears with a significantly high¹³ lagging level, although a detailed review confirms that the progress in some sectors has been significant.

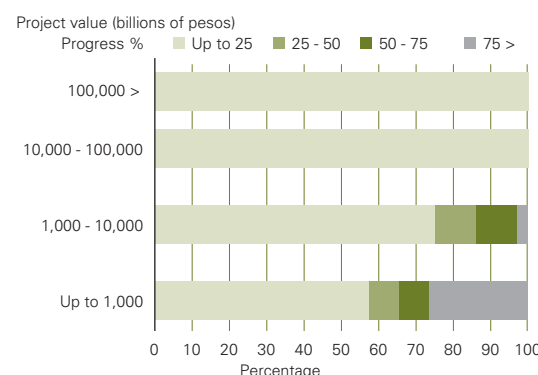
At the same time, it is interesting to note that the current environment has not substantially modified the investment program of the projects, except in the case of petrochemicals, where modifications

Progress in Projects in terms of Investment Amount: Non-Hydrocarbons % Distribution



Source: BBVA Bancomer with Finance Ministry (SHCP) data

Progress in Projects in terms of Investment Amount: Hydrocarbons % Distribution



Source: BBVA Bancomer with (SHCP) Ministry data

9 Given that the NIP is a program of the current administration, the total investment was defined as that required for the year 2007 and subsequent years. This clarification is important, given that there are projects with registered investment for previous years. If these amounts are considered, the value of the economic infrastructure projects contained in the NIP would increase from P\$3.1 trillion to P\$3.4 trillion. Two additional equally important considerations are; first, that the investment proposed for each year of those already past is assumed as realized (this clarification is also important, because nowhere is it specified that the investment has already been realized or whether it simply refers to the requirements that have been proposed from the beginning, independently of whether they materialized or not); the second consideration deals with the fact that the investment amounts are presented per year, therefore, it is not possible to extract the investment realized during 1Q09.

10 Here, it should be underscored that even though the financial crisis has delayed some projects, others have not been held back totally. Important works in execution include the Northern Arch of the Mexico City metropolitan area, which is expected to be concluded at the beginning of 2010.

11 Although in this last case, there are only ten projects that altogether do not total P\$1 billion. In 2009, there will be important expenditures as to railroads, for the metro (subway) line 12 of the Federal District, although this amount is part of the transfers to states and not specifically as federal investment.

12 These figures do not coincide with what was proposed originally in the NIP, where the hydrocarbon projects totaled P\$1.2 trillion.

or cancellations represent 37% of the programmed investment¹⁴. In the rest of the sectors, the proportion of modified or cancelled investment is substantially lower: in electricity 7%, ports 3%, water 2.5% and highways 1%¹⁵.

How are the NIP resources distributed at a state level?

Another equally relevant topic is determining the NIP investment amount and its evolution at a state level. By concentrating the greater part of resources on hydrocarbons, it is not surprising that the states of Campeche and Tabasco concentrate more than one third of the total investment to be realized. Four of the following five states, with a 10% share of the total, also have an important refining, petrochemical or natural gas industry: Veracruz, Tamaulipas, Guanajuato and

¹⁴ The data base does not specify either the reason or the date on which the projects changed from "in force" to "in the process of modification or cancellation". It is assumed that in most of the cases, it could have something to do with the current environment.

¹⁵ The fact that up to now they have remained unchanged in the registry does not either guarantee that they are not going to change. This could be the case, for example, in highways where the modified proportion is particularly low.

How much is there in Infrastructure per State?

How is it distributed?

	Non hydrocarbons		Hydrocarbons		Total			Water	Elec.	Highw.	Others	Hydrocarb.		Hidro.	Total
	MP	% of GDP*	MP	% of GDP*	MP	% of GDP*						Exp.	Others		
Campeche	3,630	3.5	757,835	731.8	761,465	735.4	Campeche	4.5	0.0	95.5	0.0	0.0	0.0	0.0	100.0
Tabasco	9,748	8.8	367,282	332.8	377,030	341.6	Tabasco	1.8	0.0	90.2	7.2	0.0	0.7	0.7	100.0
Veracruz	18,250	4.9	143,277	38.6	161,527	43.5	Veracruz	0.0	2.3	92.8	1.5	0.0	3.4	3.4	100.0
Tamaulipas	9,530	3.4	65,450	23.3	74,980	26.7	Tamaulipas	0.0	0.0	0.5	0.0	99.5	0.0	99.5	100.0
Guanajuato	7,509	5.5	35,186	25.6	42,696	31.0	Guanajuato	1.6	0.0	49.7	1.0	41.8	5.9	47.7	100.0
Oaxaca	19,707	15.0	16,367	12.4	36,074	27.4	Oaxaca	13.2	0.0	86.0	0.9	0.0	0.0	0.0	100.0
Hidalgo	13,210	2.4	20,564	3.8	33,774	6.3	Hidalgo	23.8	0.0	75.2	0.9	0.0	0.0	0.0	100.0
Nuevo León	7,225	1.1	12,369	1.9	19,595	3.0	Nuevo León	10.4	0.0	16.7	72.9	0.0	0.0	0.0	100.0
México	17,421	5.8	0	0.0	17,421	5.8	México	0.0	72.2	0.0	5.2	0.0	22.6	22.6	100.0
Chiapas	7,624	2.7	6,947	2.4	14,571	5.1	Chiapas	3.8	4.1	91.5	0.5	0.0	0.0	0.0	100.0
Guerrero	13,552	12.1	0	0.0	13,552	12.1	Guerrero	8.6	51.5	39.9	0.0	0.0	0.0	0.0	100.0
Sinaloa	10,986	6.6	0	0.0	10,986	6.6	Sinaloa	8.4	0.0	9.0	0.2	0.0	82.4	82.4	100.0
Jalisco	9,525	1.1	75	0.0	9,600	1.1	Jalisco	4.1	1.9	94.0	0.0	0.0	0.0	0.0	100.0
Michoacán	9,088	4.9	0	0.0	9,088	4.9	Michoacán	3.9	10.7	24.4	0.0	0.0	60.9	60.9	100.0
Colima	8,458	2.1	0	0.0	8,458	2.1	Colima	33.7	4.3	60.3	1.0	0.0	0.8	0.8	100.0
Chihuahua	7,990	16.9	0	0.0	7,990	16.9	Chihuahua	25.0	4.0	43.5	27.5	0.0	0.0	0.0	100.0
Sonora	7,718	3.0	0	0.0	7,718	3.0	Sonora	3.8	17.6	78.5	0.0	0.0	0.0	0.0	100.0
Distrito Federal	5,495	0.3	1,604	0.1	7,099	0.4	Distrito Federal	9.7	0.0	90.3	0.0	0.0	0.0	0.0	100.0
Baja California	6,433	2.0	47	0.0	6,480	2.0	Baja California	1.1	0.0	35.2	0.6	0.0	63.1	63.1	100.0
Durango	6,113	5.4	0	0.0	6,113	5.4	Durango	0.4	6.5	47.4	0.4	0.0	45.4	45.4	100.0
Puebla	5,687	1.8	362	0.1	6,049	1.9	Puebla	0.0	1.2	92.8	0.0	0.0	6.0	6.0	100.0
Baja California Sur	5,765	10.5	205	0.4	5,970	10.9	Baja California Sur	0.0	0.0	90.1	0.0	0.0	9.9	9.9	100.0
Zacatecas	5,835	9.1	0	0.0	5,835	9.1	Zacatecas	2.0	0.0	98.0	0.0	0.0	0.0	0.0	100.0
Yucatán	4,859	3.9	0	0.0	4,859	3.9	Yucatán	30.8	0.0	69.2	0.0	0.0	0.0	0.0	100.0
Coahuila	4,661	3.3	0	0.0	4,661	3.3	Coahuila	50.9	0.0	37.9	11.2	0.0	0.0	0.0	100.0
San Luis Potosí	3,920	2.3	0	0.0	3,920	2.3	San Luis Potosí	9.4	0.0	81.1	9.4	0.0	0.0	0.0	100.0
Quintana Roo	3,609	2.6	0	0.0	3,609	2.6	Quintana Roo	1.1	0.0	1.4	0.1	96.2	1.2	97.4	100.0
Querétaro	2,793	1.7	308	0.2	3,100	1.9	Querétaro	1.6	0.2	7.9	3.0	53.9	33.4	87.3	100.0
Nayarit	2,592	5.2	0	0.0	2,592	5.2	Nayarit	0.0	0.0	100.0	0.0	0.0	0.0	0.0	100.0
Morelos	2,155	1.8	0	0.0	2,155	1.8	Morelos	0.6	1.1	5.0	4.6	25.8	62.9	88.7	100.0
Tlaxcala	1,722	3.8	0	0.0	1,722	3.8	Tlaxcala	17.6	0.0	76.0	6.4	0.0	0.0	0.0	100.0
Aguascalientes	892	0.8	0	0.0	892	0.8	Aguascalientes	2.1	0.0	97.5	0.4	0.0	0.0	0.0	100.0
Total	243,701		1,427,879		1,671,579		Total								100.0

* Refers to the state GDP
MP Millions of pesos
Source: BBVA Bancomer with Finance Ministry (SHCP) and INEGI data

Hidalgo¹⁶. It should also be mentioned that even though a significant part of the resources, P\$1.5 trillion (46% of the total), does not have a state destination specifically assigned, practically the total amount is destined to projects of crude oil exploration (99% of the total).

It is very interesting to come to know that the value of the projects in Oaxaca, Chiapas and Guerrero (P\$64 billion), the three states with the greatest lag at a national level in terms of revenues and well-being, amply surpasses that of Nuevo Leon, State of Mexico, Jalisco and the Federal District (P\$54 billion), the four entities with the highest income. It is a good Indication, little publicized up to now, that the NIP is contributing to reducing the differences among the states in the country. More than half of the investment for Oaxaca, Chiapas and Guerrero (P\$37 billion) corresponds to highways.

¹⁶ The figures presented here do not include the required investment for the new refinery in the state of Hidalgo. When this is considered, the total amount is comparable to that of Veracruz, along the order of P\$160 billion.

How is Federal Investment in Infrastructure Doing in Your State?

Progress %

	Airports	Water	Highways	Electricity	Railroads	Puertos	Hydrocarbons			Refining	Total weighted	Rel. Share of Total investment
							Exploration	Gas	Petrochemicals			
DF				65.4	39.3					54.5	62.5	0.2
Ags			59.9								61.7	0.0
Nay		59.8	61.8								61.6	0.1
Tlax			56.0								56.0	0.1
Son		19.8	55.4			63.7					53.5	0.2
Méx		16.3	52.9	56.6							51.6	0.6
QR		87.4	50.4								51.1	0.1
Mor		55.0	44.7	66.1							48.8	0.1
Qro			50.8							24.9	48.2	0.1
SLP		28.2	56.8								48.0	0.1
Dgo		49.8	49.7	0.0							47.9	0.2
Pue			47.7					0.0	26.8		46.5	0.2
Yuc		20.2	53.1			27.6					45.6	0.2
Jal		56.1	41.6	0.0		58.4					45.3	0.3
NL			40.9		0.0					46.9	45.1	0.6
BCS			41.1							20.5	43.4	0.2
Coah		10.1	52.7								43.0	0.1
Zac			40.4								41.8	0.2
Chih		72.3	33.7								39.4	0.3
BC			37.4			39.3					39.1	0.2
Mich		24.2	40.5	63.6		31.5					34.9	0.3
Oax		85.7	53.9	81.1						1.7	32.4	1.2
Gro		49.2	31.6	26.9							32.3	0.4
Sin		30.2	50.3			54.9					30.5	0.5
Chis		38.9	49.5			87.2	4.2	35.7		2.7	29.0	0.5
Col		32.7	47.6			19.5					25.6	0.3
Hgo		70.2	37.8	46.6				0.4	39.3	2.2	18.5	1.1
Tamps	0.0	39.3	22.4	93.1		63.7	11.3	5.1		20.5	15.8	2.4
Gto		19.6	39.1					4.5		6.7	10.9	1.4
Ver		37.0	27.7	37.5		27.1	1.9	20.6	9.5	3.1	8.3	5.2
Camp		49.3	50.1			82.7	6.8				7.0	24.3
Tab		38.2	40.4			53.2	4.5	16.1			5.6	12.0
Various	17.2	20.8	17.0	29.8				4.8			26.5	1.2
Not dist.				51.6			2.4			1.1	3.3	45.3

Source: BBVA Bancomer with Finance Ministry (SHCP) data

Lastly, there is the subject of the progress made by the projects at a state level. Here also the aggregate numbers can be somewhat deceptive. For example, the Federal District, Aguascalientes and Nayarit are the states reporting greater progress in their projects (more than 60% of the programmed investment), but their contribution to the total value of the projects is of only 0.3%. In contrast, Campeche, which concentrates close to 25% of the resources, is among the states with the lowest progress, with 7%. A better panorama is achieved when analyzing the sector and the states. Thus, for example, it is observed that the highway projects are showing progress higher than 50% in 13 of the 31 states where there are these projects (all the states except the Federal District).

In water, seven of the 24 states where projects are registered¹⁷, recorded progress higher than 50%, and in another seven progress surpasses 35%. In electricity, the projects in the Federal District, Michoacan and Tamaulipas show progress higher than 60%, although there are others such as Jalisco and Durango, where the registry of the projects is not showing any progress. There are also important differences, with Campeche and Chiapas leading in the works, and Colima slightly lagging.

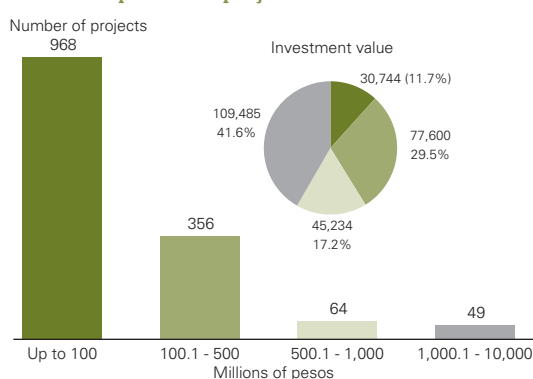
Where is the NIP heading?

Prior to developing this section, we must insist on the high degree of uncertainty that the global financial crisis has brought to the NIP projects, postponing some, limiting the scope of others and canceling still some others. To this must be added the lack of information, since there are no public parameters that could generate an easy consensus that indicate at what point the projects begin to lose their viability. This depends on a multitude of factors to be considered, from the outset the macro assumptions and of the sector itself where the project in question is being analyzed. We must also insist on the fact that the estimates are made based on the investment driven by the federal government: private investment is not under consideration, nor are the projects of the state governments. In particular, it should be noted that the investment made by the state governments has been significant in recent years, thanks to the oil surpluses and to the greater flexibility in the application of resources, and the fact that there are fewer restrictions in public investment by the states. An element that should be taken into account corresponds to the topic of rendering accounts, which would help to reinforce transparency in the use of state and municipal public resources.

Taking Into account the elements of information of a public nature, the exercise being conducted here consists in estimating the possibilities of success of the NIP projects, in terms of the degree of progress that they have shown up to now, of the investment amount they implicate and the type of activity in which they are classified (hydrocarbons and the rest of the sectors).

In the current environment, the outlook for the agents involved in the manner of processing, evaluation and bidding of the projects point to the fact that those most viable are the relatively small ones in scope or investment amount (Garcia 2009), not necessarily due

Value of Infrastructure Projects with Federal Investment Water, Electricity, Communications and Transportation*



* Highways, railroads, ports and airports
Source: BBVA Bancomer with Finance Ministry (SHCP) data

¹⁷ There are projects that are not registered in one state in particular. This is the case, for example, of the Eastern Transmitter Tunnel (Tunel Emisor Oriente), which benefits the Federal District, Hidalgo and the State of Mexico. As a whole, these projects have advanced 21%.

to their technological complexity but simply to a criterion of lack of resources. This is also suggested by the execution of the projects up to now, in which it is noted that progress has been centered mainly on those that imply relatively low amounts of up to one hundred million pesos in activities other than that of hydrocarbons and up to one billion pesos in the case of the latter.

Under conditions of financial stability, the criterion to arrange in order of importance the probability of execution of the projects would be associated with its technical and financial viability (assuming that there are no legal or institutional restrictions). However, under the current conditions, the criterion is probably more associated with investment (and, in particular, the leverage) that they imply.

Based on that, and despite its limitations, it is possible to associate the viability of the projects in the short term with their investment, especially when dealing with activities other than hydrocarbons. Thus, the projects having progress lower than 25% are considered as having the greater possibility of success (over 75%) if they imply amounts lower than the P\$100 million. In this classification, two out of every three NIP projects other than hydrocarbons are considered. A relatively high probability (higher than 50% and up to 75%) is associated with investment projects within the P\$100 million to P\$500 million range or at which progress is currently in that range; 20% of the NIP projects are here. A medium-low probability is granted to projects between P\$500 million and P\$1 billion, or rather with progress between 25% and 50%; projects in this category represent 14% of the total of the NIP. Finally, there are the projects of more than P\$1 billion, which have a low probability; only 1% of the projects surpass this amount.

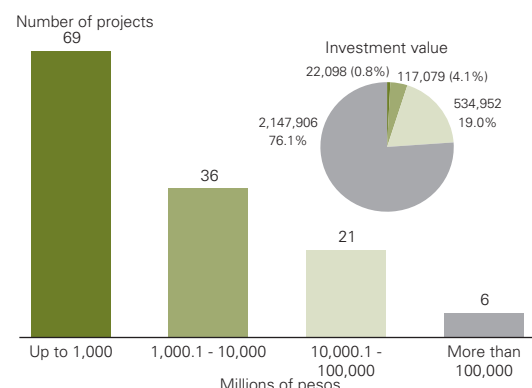
In the case of the hydrocarbon projects, this criterion does not apply, since only 5% of the projects have a value lower than P\$100 million, and, on the other hand, the bulk of the resources is concentrated on six projects, all with investments between P\$100 billion and P\$600 billion.

The results of the analysis indicate that, for sectors other than hydrocarbons, the feasibility of execution of the project (estimated as the sum of probabilities, weighted in terms of investment, for each group of projects) turns out to be higher than 50%. In highways, the probabilities could be around 60%, while for the rest of the communications and transportation sector, as well as for electricity, the probability is around 50%; slightly under that, the water projects could have a probability of success of close to 40%. As regards hydrocarbons, the characteristics of the projects (technical complexity, long maturing periods, and significant investment amounts) make it difficult to estimate the probabilities of execution based on the investment amounts. However, it should be mentioned that in activities such as gas, petrochemicals and even refining, the panorama allows for a certain optimism, whether it is because the investment is already committed or because the projects have already started.

We must insist that the criterion used to evaluate the success of the projects is short term and responds to the relative scarcity of capital, therefore, to the extent that we return to a stage of normality in the flows forthcoming from a lower global aversion to risk, we will be

Value of Infrastructure Projects with Federal Investment

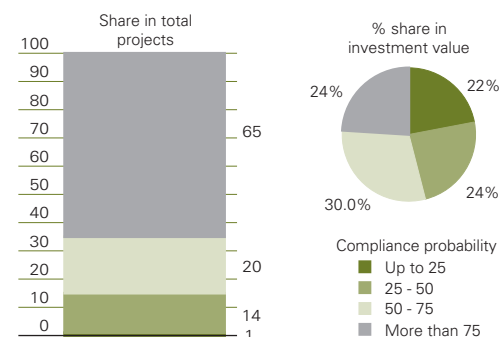
Hydrocarbons*, millions of pesos and projects
Number of Projects



* Includes Pemex projects in exploration, refining, gas and petrochemicals
Source: BBVA Bancomer with Finance Ministry (SHCP) data

How Feasible is Completion of the NIP Projects and What are They Worth?

Water, electricity and communications and transportation, %



Source: BBVA Bancomer with Finance Ministry (SHCP) data

How feasible is Completion of Programmed Investment in the NIP?

	Prob. of success %	Share in Investment, %
Non-hydrocarbons	52.9	9.8
Highways	58.2	5.3
Electricity	51.0	2.4
Communic. and Transp.	45.9	0.8
Water	37.9	1.2

* Refers to planned investment for 2007 and subsequent years
** Ports, airports and railroads
Source: BBVA Bancomer with Finance Ministry (SHCP) data

able to observe different criteria that could modify these opinions. Another option would be that of modifying the projects to reduce the relative role of the private sector, reducing their leverage, or temporarily limiting the scope of the projects.

Conclusions

The NIP sets ambitious goals, although in line with what Mexico should aspire to in terms of its income level. Due to this, it should be taken into account that it is appropriate to set important goals that imply efforts by those involved. It should also be recognized that steps have been taken in the right direction, for example in seeking to expedite the performance of federal spending, without abandoning the rendering of accounts. Great care must now be taken regarding the quality of investment. However, a strong effort is necessary, as well as important modernization within the framework of the execution of expenditures at a state and municipal level, favoring improved transparency, rendering of accounts, and selectivity in terms of impact on economic activity. Resources will always be scarce and limited, and, because of this, their application and effectiveness should be carefully watched at all times.

As of now, due to the important lag in infrastructure and to the difficult current situation, management at the various levels of government (federal, state and even municipal) that seeks to privilege current expenses over those of investment can be sustained with difficulty. The need is evident to seek to reassign expenditures toward productive investment, which will be a detonator for growth by complementing and strengthening investment from the private sector. Mexico is a country with low levels of public debt and now has, for the first time in view of various external shocks, the opportunity to materialize an anti-cyclical fiscal policy, which should be taken advantage of to boost profitable and productive long-term projects.

Nevertheless, the need to materialize a comprehensive financial reform that will expand the taxpayer base, increase tax revenue and improve the rendering of accounts of public spending, especially at a state and municipal level, should not be forgotten.

From an analysis of the investment spurred by the federal government in the NIP, it can be concluded that the program presents strong differences among the sectors, with some, such as communications and transportation showing important progress and others such as oil production and exploration—the most important ones—showing little progress. From a regional standpoint, it is interesting to note that, aside from hydrocarbons, investment will privilege those states with the greatest lag in terms of well-being.

In this sense, it is evident that, overall, the NIP shows a considerable lag when it includes the oil sector, due to its high specific weight. However, it is important to point out that in other sectors of the NIP, greater progress can be observed, and only a limited delay in projects. Within this context, with a medium-term vision, at some time, when circumstances permit, the programs in non-oil areas could be evaluated and expanded, either through the participation of the private sector and through the expansion of the defined amounts by the public sector itself.

The international financial crisis has come to complicate the scenario, but basically a good part of the delay in the program has to do with the legal and institutional bottlenecks. Without stopping to emphasize the fact that there must be an improvement in the capacity of execution, elements seem to emerge that could unleash a good number of projects, including legal reforms and greater resources—as well as technical capacity—to prepare and evaluate them. Should this be the case, the NIP detonator will be the return to financial stability.

How successful will the NIP be? It is difficult to specify, but it is clear that in the current circumstances, those projects with the greater viability will be those involving a lower amount. By making some projections, based on the progress made up to now and the investment required, we may conclude that, excluding hydrocarbons, more than 50% of the investment proposed in the project portfolio in which the federal government contributes resources, could be completed in the terms in which the projects are currently proposed. Even in hydrocarbons, some activities such as gas and petrochemicals seem to have relatively high possibilities for reaching their goals.

In brief, despite the adversities and the lack of experience, it is necessary to eliminate restrictions and to reduce learning costs, which could lead to important progress in the medium term in terms of infrastructure in the coming years. In the end, this will make it possible to achieve higher potential growth and a more balanced regional development.

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How many jobs does the investment undertaken through the National Infrastructure Program have the potential to generate? What economic activities will receive the greatest boost from the construction of these work projects? Answering these questions could help us evaluate—with uniform and coherent criteria—the economic impact on the different sectors due to the application of the federal government's main program to counteract the effects of the economic recession. This study will delve into these issues, based on the use and interpretation of the 2003 Input-Output Matrix, a not very utilized but very solid and detailed tool on the structure of the economy. Beginning with considerations on its origin, importance, and applications, this article will synthesize the results of using the Input-Output Matrix to estimate the impact of investments in infrastructure that will be undertaken over the course of 2009, in terms of production, employment, and imports on a national level.

What is the Input-Output Matrix?

The input-output matrix consists of a matrix representation of the relations between the different sectors of an economy in a given moment in time. It shows the way in which some industries depend on others, and how the products that are generated in one sector serve as inputs for others or for final consumption. In addition to determining intermediate and final demand and the origin of production (national or imported), the matrix registers the payment to the factors of production. That is, it calculates labor intensity and payment for labor, as well as the gross profit margin in each activity. It can be said, then, that it is an X-ray of an economy, with detailed information on the state of technology, efficiency, and the relationship between sectors.

The idea of having a complete representation of the economy through an input-output matrix originated in the middle of the 18th century¹, and what is interesting is that from that time and up to the present, neither the concept nor the methodology to calculate it have changed, which demonstrates its validity over time. At the same time, the greater ease that advances in computerized systems offer for making matrix calculations allows for an expansion of their applications.

The statistical preparation of the input-output matrix, that is, gathering and processing the information implies a high cost, in terms of time, quantity, and detail. However, the interpretation is simple and direct, and the contributions that the input-output matrix can offer in terms of conclusions are considerable. Its main limitation involves the assumption of constant technology, given that the matrixes that allow for relating each industry to the rest of the economy, use fixed coefficients, where implicitly it is assumed that neither technology nor the relative existence of factors of production change over time. The most common solution to this problem has been to periodically update the matrix.

In the case of Mexico, the National Statistics Institute (INEGI) prepared a new input-output matrix based on the 2003 economic censuses². The process also enabled the INEGI to introduce modifications to and update the national accounts system³. What would perhaps be best

2009 Investment in Infrastructure

	Billions of pesos
Total	599
Federal Gov't Expenditures Budget 2009	569
Resources from surpluses in 4Q08	30
Pemex	17
States	13

Source: BBVA Bancomer with data from the 2009 Federal Government Expenditures Budget

- 1 François Quesnay raised the issue in his *Tableau Economique*, in 1759. He became popular in the 1930s, when Wassily Leontieff (who won the Nobel Prize as a result) resolved the matrix to the point of quantifying the value of the entire economy.
- 2 The previous Input-Output Matrix corresponded to 1980.
- 3 Among the most important are the adoption of 2003 as the base year, greater precision in the figures, as well as a more detailed breakdown of the information and making such data consistent with the North American Industry Classification System, or SCIAN.

is that from now on the matrix should be periodically updated, at least every five years. This will allow for a more rigorous comparison of the state of the economy at specific times.

Measuring the impact of infrastructure

According to the Federal Government Expenditures Budget, the amount of resources to be spent on infrastructure projects in 2009 is about 600 billion pesos, or around 5% of GDP. Of this figure, P\$570 billion correspond to the budget approved by Congress, and P\$30 billion will come from surpluses from oil and tax revenue generated during the last quarter of 2008, to be distributed between Petroleos Mexicanos (Pemex) (P\$17 billion) and transfers to state governments for investment projects (P\$13 billion)⁴.

A part of the resources corresponds to activities such as job training, support to small companies, and development bank guarantees, among others. The amount to be invested in infrastructure projects is close to P\$537 billion, or 85% of the total. In 2008, investment in the same items reached P\$450 billion. The difference in spending between the two years, of about P\$87 billion, is equivalent to 0.7% of GDP.

Simulating the boost that the economy would receive from the increase in investment spending in 2009 compared to 2008 involves nothing more than measuring the effect of this 0.7% of GDP, making the calculations based on the 2003 input-output matrix. The next question is to decide where to incorporate it within the matrix. In the national accounts, the aggregate demand item that registers investments in infrastructure corresponds to gross fixed investment, and the branches of economic activity in which such investments should be incorporated⁵ (or where 2009 spending will be higher than in the previous year) are oil and gas extraction; electric power generation and transmission; water and gas distribution; construction; civil engineering or major work projects, and the production of oil products.

The results on a sectorial level

The simulation with the input-output matrix allows identifying how the increase in investment spending will be distributed within the economy. That is, what implications it will have for the production of intermediate goods, imports, and employment. In other words, to what extent a counter-cyclical effect derived from such spending⁶ can be expected

In terms of production, the growth in investment in infrastructure in 2009 in relation to 2008 will imply an increase in the demand for intermediate goods, mainly in the mining, electric power, gas, and water sectors and the construction industry. The GDP of these sectors could grow from 2.7% (in construction) to 4.8% (mining), while their imports could post additional increases in ranges of close to 3%. In some service sectors, such as financial services and insurance, as well as those that support businesses, the GDP growth could be between 0.3% and 0.5%. Manufacturing and retail trade could grow by an equivalent to 0.3% in terms of GDP. Other activities that will receive a more modest benefit (of between 0.1% and 0.2% of GDP) could be transportation and shipping, mail and storage, information in the mass media, rental or leasing services, as well as hotels and restaurants.

4 In addition, Banobras will contribute resources of around 65 billion pesos, for guarantees and for the designing of executive projects

5 In measuring the effect of the increase in investment, the breakdown made by the INEGI is used in 79 branches of economic activity.

6 It should be emphasized that the analysis is limited to identifying the distribution of the increase in spending, and not an additional boost to growth caused by such additional expenditures.

How will Investment be Distributed in 2009?

Billions of pesos

	2008	2009
Total	519.1	599.7
Infrastructure*	466.5	536.6
Hydrocarbons (oil and gas)	161.1	244.5
Urbanization and housing	148.6	108.1
Highways	63.2	50.4
Electric power	51.7	40.5
Health	14.4	18.9
Potable water and sewage systems	22.5	18.5
Education	29.2	17.6
Others**	—	14.0
Forestry and agricultural develop.	14.7	12.4
Airports, ports, and railroads	12.4	10.1
Other communications	1.2	1.6
Other investment***	52.6	63.0
Financial services	35.1	37.7
Business issues	6.3	9.5
Science and technology	2.1	5.7
Sustainable development	2.6	5.2
Social security	0.1	2.2
Tourism	1.2	1.5
Social assistance	4.6	0.8
Labor issues	0.6	0.5
Agricultural issues	0.1	0.1

* Figure estimated based on the results in public finances at the close of 2008 and the distribution of the 2008 Federal Government Expenditures Budget resources.
 ** Oil and fiscal surpluses in 4Q08 distributable to state governments for investment in infrastructure
 *** Assumes that the figure is equal to the 2008 Federal Government Expenditures Budget
 Source: BBVA Bancomer with SHCP (Finance Ministry) data

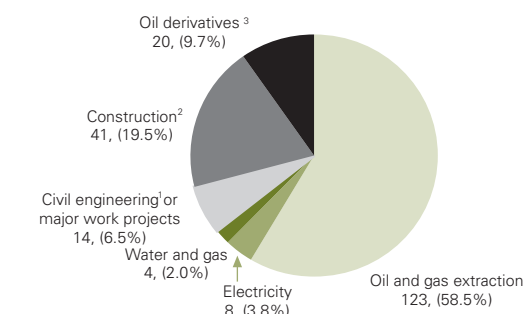
How Much does the Increase in Investment in 2009 Represent?



Source: BBVA Bancomer with SHCP (Finance Ministry) data

What Economic Activities should Reflect the Increase in Investment in 2009?

Increase in spending in 2009 vs 2008 by branches of activity, billions of pesos and %



1 highways, ports, airports, and railroads

2 schools, hospitals, and others

3 oil refining

Source: BBVA Bancomer with INEGI and SHCP (Finance Ministry) data

What Economic Activities will post the Greatest Growth due to the Investment Increase in 2009

Real annual % change, effect on

	National produc-	Importaciones
Total	0.7	0.4
Mining	4.8	3.0
Electricity, water, gas distribution, gas pipelines	3.2	2.7
Construction	2.7	2.7
Corporate and business leadership	1.5	1.5
Financial services and insurance	0.5	0.5
Business support services	0.4	0.4
Professional, scientific, and technical serv.	0.3	0.3
Manufacturing industries	0.3	0.1
Retail trade	0.3	0.3
Transportation	0.2	0.2
Other services (excluding Gov't)	0.2	0.3
Information in the mass media	0.2	0.1
Mail and storage	0.2	0.1
Real estate and rental services	0.1	0.2
Temp. housing services and prep. of food and beverages	0.1	0.1

Source: BBVA Bancomer based on simulations with the 2003

How Many Formal Jobs will the 2009 Increase in Investment Generate?

IMSS-affiliated Workers

	Thousands
Total	111
Other services	39
Manufacturing	27
Retail trade, restaurants and hotels	15
Construction	14
Transportation and communications	8
Agriculture	4
Mining	3
Electricity, gas and water	2

Source: BBVA Bancomer based on simulations with the 2003 Input-Output Matrix

Behind these statistics are the so-called multiplying effects, such as when an increase in the production of a good leads to a more than proportional growth in the production of others. Therefore, what the figures register is the effect of increasing capital formation in some activities on the production in others. Although the final result is only a distribution of the resources, what is important is that considerable increases are posted within the productive chain.

Benefits for employment

There are also implications for employment. To calculate the impact associated with the increase in investment spending, it is necessary to analyze the so-called "technical coefficient matrix", which represents the production functions of each branch of economic activity. This implies, naturally, intensity in the use of labor. Thus, we find, for example, that in the production of any industry, a certain quantity of raw materials and a given number of workers are required. Based on the estimates made, the increase in investment in infrastructure during 2009 could translate into the creation of 110,000 new jobs in the formal sector of the economy⁷. It is necessary to draw at least two conclusions with regard to this result. The first is that, although it seems surprising, most of the jobs associated with this growth will not be in industry but in services, specifically 55%, distributed between professional, technical, and social services and government activities (35%), and retail trade, restaurants and hotels, together with transportation and communications (20%). Meanwhile, manufacturing and construction will together account for 30%, while the rest of the jobs will correspond to primary sector activities, mining and electric power, gas, and water.

The second consideration has to do with the relative importance of the jobs generated. Considering that the economy could lose somewhere close to 600,000 jobs in the year, the estimated figures based on the input-output matrix indicate that with the work projects that will be undertaken, between 15% and 20% of such jobs could be recovered.

Conclusions

The government feels that infrastructure will be its main strategy to counteract the global recession, with spending in physical investment above 5% of GDP in 2009, the highest level in history, and in the range of what the National Infrastructure Program has identified as the "optimistic" scenario. Based on the input-output matrix, the strategy could not be more appropriate. For some activities it will contribute to muffling the effect of the contraction in demand. Even though it will not be enough to reverse the drop of the economy, it could, in fact, compensate between 15% and 20% of the projected loss in jobs in the formal sector for this year.

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⁷ In fact, the figure that is obtained based on the input-output matrix is 267,000 employed people, although the percentage share corresponding to the formal economy or the number of workers registered in the Mexican Social Security Institute (a reflection of jobs in the formal sector) in relation to the total employed population barely reaches 30%.

What is the Most Profitable Investment?

Investment in infrastructure is a key element to spur economic growth and create jobs. It should fulfill some desirable characteristics, specifically, it should be complementary and not be a substitute for private investment¹; it should be undertaken in high quality projects, profitable from a social and economic standpoint; there should be a rigorous selection of projects that will allow for maximizing their impact on an individual and overall level. If these characteristics materialize adequately, it is possible to generate greater productivity and competitiveness in the economy, which will allow boosting potential growth and along with it, achieving a higher level of well-being. In these circumstances, identifying the projects whose implementation would generate the greatest impact for the domestic economy can be highly valuable in the context of a counter-cyclical economic policy. Some of the criteria for prioritizing such projects include a higher national content and the creation of a greater number of jobs. Can the input-output matrix help in this process?

Given that the input-output matrix allows for simulating on a national level the effects on production and employment associated with variations in the components of aggregate demand, such as capital formation, it is worthwhile to consider which of the different economic activities allow the domestic economy to better absorb increases in investment. This is equivalent to identifying the activities that more strongly transfer these increases in investment both to products of national origin as well as to the creation of paid jobs.

This section presents the results of simulating—for each of the branches of economic activity considered in the input-output matrix where public investment has a direct or indirect impact—the effect on the domestic economy²—both on the level of production as well as on employment—of an increase equivalent to 1% of GDP in the capital formation component of aggregate demand³.

The public investment that has the greatest impact on domestic production

Of the 79 branches of economic activity contemplated in the input-output matrix there are 18 in which public

investment has a direct or indirect impact. The impact can be classified in three categories, depending on its effect on the demand for domestic products in response to increases in capital formation, or the capacity of the economy to absorb this spending, making use of internal resources. High impact activities are those in which the demand for domestic products is more than proportional; medium-high impact activities are those in which demand is close to, although less than proportional to, the increase in spending; medium-low impact activities are those in which the increase in the demand for national products is modest in relation to the growth in investment, that is, the result obtained from a unit of investment made in this sector is significantly lower.

It is interesting to note that in the first group, the high impact category, different activities appear directly related with investments in infrastructure that are currently being undertaken. These include the production of products derived from oil and coal; electric power generation; construction; civil engineering projects, such as highways; and transportation infrastructure (ports and airports).

In the medium-high impact category, there are also some activities that benefit, although indirectly, from infrastructure construction, such as rail transportation, specialized construction projects, and the distribution of water and gas.

Finally, there is the medium-low impact category, marked by activities related to the very size of the government apparatus, and in which the interpretation is quite intuitive and direct, namely, increasing the weight of the bureaucracy as part of the economy through greater spending on consumption. Although the impact is low because part of the revenue is saved, in the medium term such spending is less productive and more onerous for society. With this, the clear preference and allocation

¹ That is, there is no crowding-out effect.

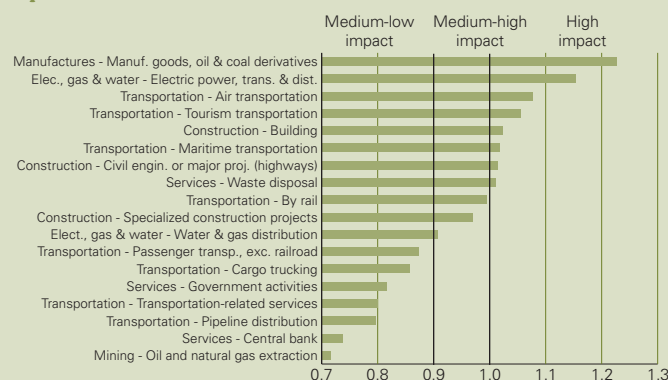
² The simulations are made based on the matrix of the domestic economy, which excludes imports. It is important to emphasize that the exercise can also be made with the matrix of the total economy, where the interpretation would be the effect on demand of the use of resources, imported or national, associated with increases in investment.

³ In the case of production, the exercise consists of identifying the activities where, once the necessary transformations are carried out (the multiplication of the final demand vector once growth—due to direct and indirect coefficient matrix—is incorporated for the domestic economy), the new vector of the gross production value (that is, the sum of the production value for the 79 economic branches) posts the most significant increase in relation to its original level. For employment, an intensity coefficient in the use of manpower is obtained, based on the gross value of production and the matrix of the total employed workforce. These figures are incorporated in the simulations of increases in production value to obtain estimates in relation to paid employment.

of public spending earmarked for investment projects and not for current expenditures is reaffirmed.

Where does Private Investment Have the Greatest Impact on Production?

% change in internal demand in response to investment increases equivalent to 1% of GDP



Note: considers only those activities in which public investment has a direct or indirect effect

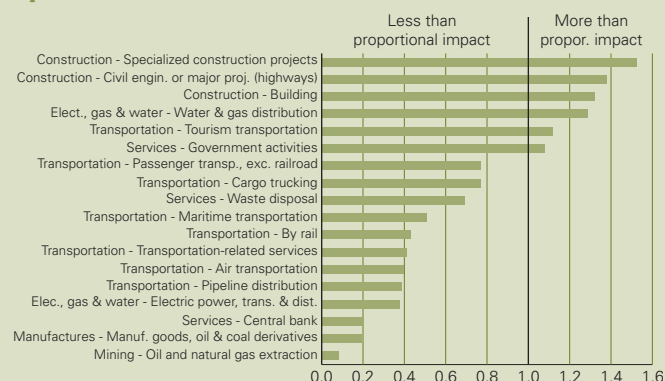
Source: BBVA Bancomer based on the 2003 Input-Output Matrix, INEGI

... and in employment

With regard to employment, sensitivity to the increase in investment for the 18 economic branches under consideration allows identifying two categories, namely, where the impact is more than proportional and where it is less than proportional. The former would correspond to activities related to the construction sector, such as specialized work projects, civil engineering projects, and construction.

In What Economic Activities does Investment Create the Most Jobs?

% change in internal demand in response to increases in investment equivalent to 1% of GDP



Source: BBVA Bancomer based on the 2003 Input-Output Matrix, INEGI

The explanation for this is directly related to the intensity of the use of manpower. Among all the economic branches considered, these are the ones that require the greatest number of workers per unit of production generated (measured in value). On the opposite end are the capital intensive activities, such as those related to the oil industry, electric power generation, and transportation. It should come as no surprise to note that in these activities increases in investment have little impact on employment.

Conclusions: the National Infrastructure Program in the correct sectors

The simulations based on the input-output matrix aimed at identifying the economic activities with the most capacity to incorporate the increases in investment in the national economy are a reaffirmation that the strategy that the government has followed in its counter-cyclical policy is the appropriate one. Indeed, among the activities where the investment promoted by the government has a direct or indirect impact, infrastructure offers high profitability, in the sense that it more than proportionally spurs the use of inputs of national origin and creates jobs. What is important now is to materialize investment projects and ensure good quality in such a way that this has the greatest impact on the economy.

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II. Key Issues in Financing

- Who finances infrastructure projects in the world?
- Is private sector participation in infrastructure a phase or a necessity?
- What lessons should be learned from past experiences in private sector financing in infrastructure?

Financing for Projects Becomes Complicated

Billions of U.S. dollars, Aug. 2008 to Jan. 2009

How has the crisis affected the projects?	Proj. w/out financ.*		Total survey	
	US\$bill.	No.	US\$bill.	No.
No impact	11.1	14	89.5	200
Financing at higher cost	1.0	2	3.3	7
Restructuring	0.1	1	11.1	5
Delay	0.1	16	32.1	26
Potential delay, due to crisis	25.4	26	49.0	60
Potential delay, other factors	5.8	7	6.3	9
Cancelled	1.9	1	3.0	6
Potential cancellation	3.5	1	3.9	2
Total	49.0	68	198.1	315

* Project still without financing. The projects for which financing is still pending represent 22% of the total sample. The rest have already obtained financing, the deal is being closed, or the project is in the bidding stage.

Source: BBVA Bancomer with World Bank data

Shortage of Financing is not the Same for All

US\$Billions, Aug. 2008 to Jan. 2009

How has the crisis affected the sectors?	Energy	Transportation	Total
No impact	54.2	26.8	81.0
Financing at higher cost	2.8	0.5	3.3
Restructuring	0.7	10.4	11.1
Delay	13.6	18.5	32.1
Potential delay, due to crisis	33.8	15.2	48.9
Potential delay, other factors	1.8	4.5	6.3
Cancelled	0.5	2.5	3.0
Potential cancellation	3.5	0.4	3.9
Total	110.7	78.7	189.5

Source: BBVA Bancomer with World Bank data

The financial crisis that the world is experiencing, with its lack of liquidity and high risk aversion levels—which even though they have tapered off, still remain high—has undoubtedly made it difficult to obtain financing for infrastructure projects, which, almost by definition, have long maturation periods and some dose of uncertainty. Different countries have chosen to increase such investment expenditures, both to avoid suspending key projects as well as to counteract the downturn in economic activity. This article delves into these questions, with a panorama spanning the current context and the outlook for the next few next years. Nevertheless, the outlook continues to be encouraging, since with a view beyond the immediate horizon, the sources of funds to finance such projects have multiplied and infrastructure is still an attractive option as a long-term investment instrument.

The crisis limits financing

There is no question that the global financial turbulence has quite significantly limited financing for infrastructure projects. The cost of financing and the risk premiums have risen, and according to the Institute of International Finance (IIF), in 2009 capital flows to the developing countries will be around US\$165 billion, equivalent to one third of 2008 levels, which, in turn, were half of those registered in 2007, US\$929 billion (IIF, 2009). This context translates into greater competition for resources, more intense scrutiny in appraising projects and basing such evaluations on more conservative criteria (possibly granting shorter term loans and higher rates), in addition to lower financing amounts—or the debt to capital ratio—in all the projects regardless of their scope.

The first manifestations of the impact of the crisis point in this direction. Based on information from 315 infrastructure projects in developing countries around the world, the World Bank unit specializing in advising on infrastructure projects with private sector participation (the Public Private Infrastructure Advisory Facility or PPIAF) noted that in the period from August 2008 to January 2009, financing of such projects decreased by an annual 15%, measured by the amount of investment and 20% when measured by the number of projects financed. (World Bank, 2009)

Among the projects surveyed by the World Bank, 16% registered delays and an additional 25% faced the risk of being postponed. From the standpoint of sectors of economic activity, the greatest impact was felt in transportation. Compared with projects in other sectors, such as energy, transportation projects have encountered greater difficulties in obtaining financing. In part, this result could be reflecting the concerns of potential investors in relation to the impact of the current crisis on the real sector of the economy. Figures from the U.S. Department of Transportation show that in 2008, air traffic to and from the United States grew 2.8% (its growth rate in the four previous years had exceeded 5%) and for 2009 a contraction of close to 1% is expected. Meanwhile, for 2009, the WTO estimates a potential decline in world trade on the order of 9% compared to the previous year (WTO, 2009).

In synthesis, the financial context and the uncertainty surrounding the magnitude of the global recession does not help infrastructure financing. Governments' capacity to guarantee the resources is limited, especially in a period of lower tax revenue. Thus, conditions indicate

that in the current period, relatively small and/or low-risk projects will in a better position to obtain financing than projects that are new, ambitious and linked more to the economic cycle.

... but, potential investors continue to be out there (and growing)

Independently of the current period, investment in infrastructure has been growing quickly in recent years, with new plans and participants. There are a series of elements that contribute to explaining this trend, and which in the final analysis, represent the basis for optimism in the medium term.

1. The competition for public sector resources

In the advanced economies, public spending on investment in infrastructure has been diminishing. Measured as a percentage of GDP, it has fallen from 9.5% in 1990 to 7% in 2005. The decline can largely be attributed to the increase in spending requirements in the fields of health and pensions, which in the same time frame rose from 5% to 6.7% in 2005. The trend in this spending item will not be modified in the next few decades. For example, OECD estimates indicate that such expenditures could reach 13% of GDP in 2050. At the same time that spending is pressured, it also seems inevitable that there will be a decline in tax collection levels (at least in the OECD member countries), associated with the aging of the population, and along with it, its lower labor productivity, which will tend to reduce the universe of taxpayers.

Thus, it is clear that it is becoming necessary to have alternative sources of financing that complement the investment undertaken by the public sector. Involving private sector participants, taking advantage of the potential offered by pension funds, designing more efficient rate policies, promoting institutional changes that allow for a reduction in project costs and for an improvement in their operation, are among the main solutions that are being put into practice on a world level.

2. The growing importance of the private sector

The first and most important alternative is the private sector, which already plays an important role. The privatizations of recent years have been centered on infrastructure. In the OECD member countries, for example, between 1990 and 2007, close to two thirds of the privatizations undertaken corresponded to electric power plants, transportation and telecommunications. In the same period, among countries that are not members of the OECD, close to 50% of the privatizations occurred in infrastructure-related activities (OECD, 2007).

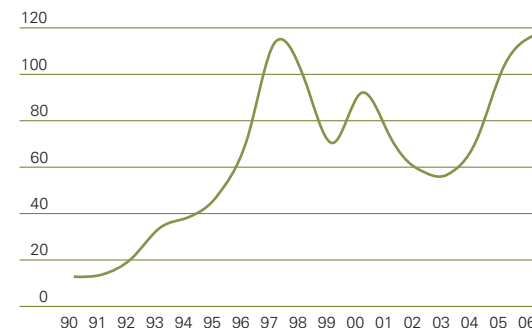
Through the participation of the private sector, investment in infrastructure projects on a global scale increased close to twelve-fold between 1990 and 2007, from around US\$13 billion to US\$158 billion dollars¹. In accumulated terms, the amount invested in projects with private sector resources (total or partial) was US\$1.1 trillion dollars.

On a sectoral level, energy—particularly electric power generation and natural gas processing and distribution companies—was first in importance during the 1990s, although telecommunications took its place in the past decade and strongly concentrated the participation of the private sector. In more recent times, transportation projects—mainly highways—have taken on greater importance, but the amount of their investment remains lower.

¹ The amounts refer to projects with private sector participation, although such investment is not necessarily exclusive. World Bank, Private Participation in Infrastructure Database.

Private sector Investment in Infrastructure on the Rise

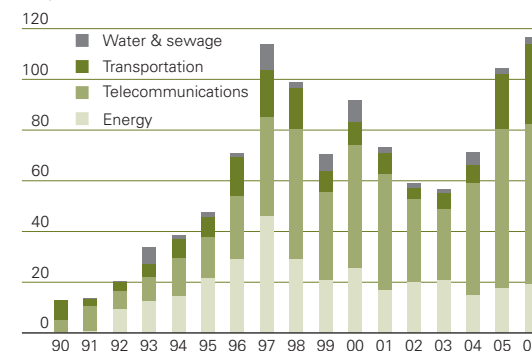
US\$Billions, 2006



Source: BBVA Bancomer with World Bank data

In what Sectors is Private Sector Investment in Infrastructure Concentrated?

US\$Billions



Source: BBVA Bancomer with World Bank data

In recent years, the model based solely on privatizations or concessions has been losing ground to public-private partnership formats (APP for its Spanish initials), given the recognition that questions related to the quality of the work projects and services, the financing and bottlenecks on the regulatory level, can only be dealt with efficiently when there is coordination between private participants and the public sector.

The models for partnership with the public sector gained popularity just a decade ago, with the approval in the United Kingdom in 1997 of what is known as the Private Finance Initiative. The public-private partnerships range from the simplest models in which the private parties only participate in the design and construction of projects, and in concessions and privatizations, where they build and operate them exclusively. Such projects are based on long-term contracts (15 to 30 years) in which the private sector gets paid based on the cash flows generated by the project or periodic payments for providing services. The type of public-private partnership depends on the type of project (if what is involved is new infrastructure or providing maintenance for already existing infrastructure) and of the maturity of the system to incorporate its use, which implies an appropriate legal framework.

Typically, the public-private partnership involves the construction of the work projects by the private sector, together with a concession for a specific period to recover the investment through the flows generated by the project, usually fees or tolls. With some variants, the use of such partnerships has rapidly expanded, both in the industrialized as well as in the emerging economies.

The range of activities that can be contemplated in the public-private partnership format is increasingly greater, and includes schools, hospitals, highways, jails, water treatment, and solid waste disposal, etc. In general, all the activities and services carried out by the government could be considered, except those that cannot be delegated due to their nature, such as public security and defense.

How good have the results from the public-private partnerships been? A study conducted by the World Bank aimed at comparing the performance of state-owned enterprises and private companies in providing electric power and potable water² showed significant increases in operating efficiency when private investors were involved. For example, labor productivity (sales per worker) rose between 18% and 32%, electric power losses were reduced by 11%, and service coverage increased between 12% and 19% (World Bank, 2008).

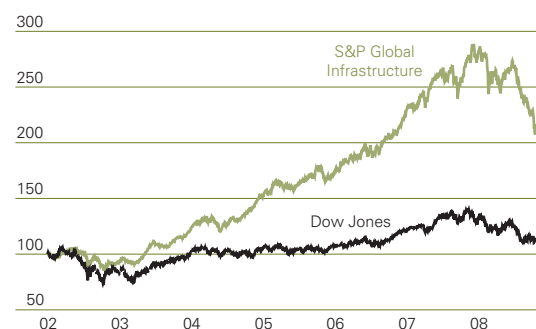
3. Institutional investors seek new instruments

Institutional investors, such as pension funds, are an important source of resources for financing infrastructure. Elements that make infrastructure projects attractive for investment funds with a long-term horizon are their long life, high operating margins, as well as general coverage against inflation³. Compared to other investment instruments, they

- 2 The sample involved 1,227 companies on a world level that supply electricity and drinking water. It compares companies with some type of private sector participation (concessions or public-private partnership models) with completely state-owned enterprises, with comparable operating scales.
- 3 In general, they operate as monopolies in markets with relatively inelastic demand. In addition, the growth in the flows is tied to the evolution of GDP (or of the population), and fees and tolls are adjusted in many cases to inflationary behavior.

Is Investment in Infrastructure Profitable?

Indexes, January 2002 = 100



Source: BBVA Bancomer with Bloomberg data

offer higher yields than fixed-income securities, limited volatility, and little correlation with other financial assets⁴.

In the OECD member countries, assets managed by pension funds rose from US\$13 trillion to US\$18 trillion dollars between 2001 and 2008. Measured as a percentage of their GDP, the amount is equal to 88%. In countries such as the Netherlands, Iceland, Switzerland, and United States the figure even exceeds 100%. The investment that pension funds currently have in infrastructure is still low. ABP, the most important pension fund (with close to US\$300 billion dollars under management) has invested in infrastructure assets, but up until now this has represented less than 1% of its total assets (OECD, 2007).

In the case of Mexico, through 2008, the assets managed by Afores (Retirement Fund Administrators) accounted for close to 8% of GDP. Recent changes in legislation have made the Afores investment regime more flexible⁵, opening up the possibility of including infrastructure projects in their portfolios. It is estimated that based on the current structure of the investment portfolio, infrastructure financing is equivalent to 0.5% of GDP⁶, and could reach 1% in 2012 (see article on financing potential through Afores).

... and others

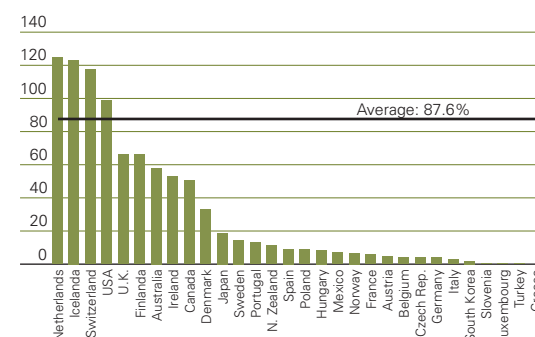
The specialized mutual funds and the private capital funds represent additional sources of financial resources. Between 2000 and 2007, the value of the assets held by mutual funds on a world level rose from US\$12 trillion to US\$26 trillion dollars. This figure is equivalent to nine times the value of infrastructure projects that trade on the stock exchange on a global scale, along the order of US\$3 trillion dollars⁷.

Companies dealing in infrastructure play an increasingly important role in the stock market and their current capitalization value represents about 6% of global equity in the securities market⁸. Thus far, the market has been concentrated in the OECD member countries, which can be explained by the lower risk in the projects in relation to the emerging economies and a more developed capital market. But even within the OECD nations, there is a strong concentration of such activities. Japan and Italy alone account for 50% of the value of the assets; if Spain, Canada, and Australia are included, the figure reaches 80%. Toll highways are the most securitized activity, and account for 36% of all the assets listed. Companies that process natural gas are in second place, with 29%, followed by electric power companies, with 12%.

No less important are the sovereign wealth funds (SWF), whose growth in terms of numbers and value has been explosive in recent years⁹. Estimates by the McKinsey Global Institute indicate that the value of SWF in China and the oil exporting countries alone will increase from

How much Money do Pension Funds Manage?

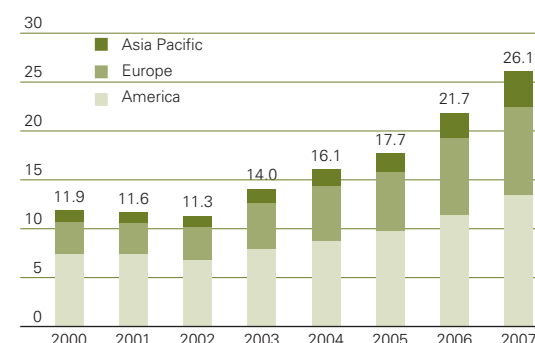
OECD, % of GDP



Source: BBVA Bancomer with OECD data

How Much \$\$ do Mutual Funds Hold on a World Level?

Asset value, trillions of US dollars



Source: BBVA Bancomer with Investment Company Institute data

4 Brookfield Asset Management.

5 Until March 2008, the legal framework only considered two types of Siefors (Specialized Retirement Fund Investment Companies) in terms of the composition of their portfolio. The legal changes in force as of that date allowed expanding the format to five Siefors.

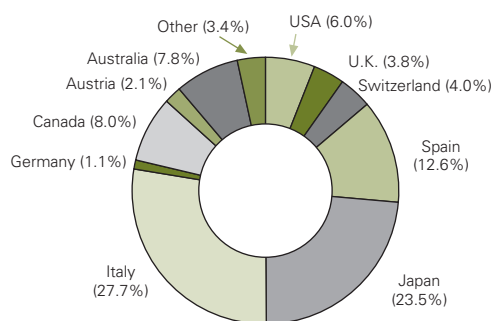
6 Considering that, as a percentage of the portfolio balance, the investment in transportation (highways and others), telecommunications, and housing is 5.4%.

7 For the mutual funds, valuation was done by the Investment Company Institute, while for infrastructure assets it was undertaken by Lazard Asset Management, both through December 2007.

8 Estimated by Lazard Asset Management at US\$54 trillion dollars.

Where are Infrastructure Assets Listed in the Stock Market?

% of asset value



Source: BBVA Bancomer with Lazard data

US\$9.2 trillion to US\$16.6 trillion dollars between 2007 and 2013. Their investment targets have multiplied in similar fashion, from acquiring equity in global financial institutions, to strengthening their dominant position in some markets (the case of Russia with Gazprom), to assuring the medium-term supply of inputs (the case of China with the acquisition of large extensions of land in African countries)¹⁰. At the present time, infrastructure-related activities could represent up to 5% of the total assets managed by the sovereign wealth funds (Drezner, 2008).

In Mexico, at the beginning of 2009, mutual funds managed net assets equivalent to 6.7% of GDP¹¹. The government can also count on the resources of the National Infrastructure Fund (Fonadin), created at the beginning of 2008 to complement public or private investments in these projects, with 50 billion pesos in initial resources, which could reach 270 billion pesos in 2012 (SHCP, 2008). For 2009 alone, it is expected that the Fonadin will contribute close to 65 billion pesos in resources.

4. Efficiency and innovation will help financing

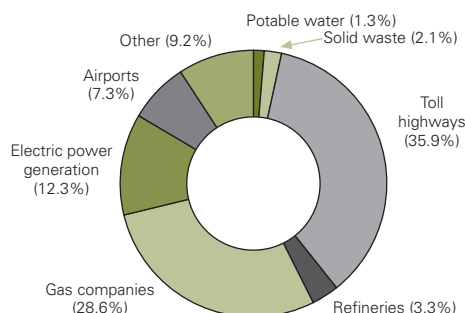
But there are other alternatives that do not require the participation of the private sector and which can make important contributions to financing. Among the most important are designing more efficient mechanisms for collecting fees and tolls and reforming the regulatory framework to achieve better planning and operation of the projects.

In terms of the collection of fees and tolls, their price should incorporate real costs, the shortage of resources, and thus send "correct" signals that will allow for improvement of how demand is managed. An example is individualized toll collection on highways and bridges, by having users pay for what they use, that is, payments based on the distance that they travel, the types of roads that they use, the frequency of their trips, the type of vehicle they drive, etc. In addition to increasing revenue, these policies allow for better management of demand and represent an effective measure for controlling traffic.

Another important measure is to reduce the vulnerability to short-term (political) interests (or interest groups); for example, through 10- to 20-year strategic plans and funds invested only on infrastructure, also with a long-term investment horizon. This will generate greater certainty in terms of the continuity of the programs, as well as transparency in their implementation and management. This will also avoid the limitation of resources being assigned based on their availability in the fiscal budget in a given period (OECD, 2007).

What Type of Infrastructure is being listed in the Stock Market?

% of asset value



Source: BBVA Bancomer with Lazard data

9 Naturally, everything up to the beginning of the current crisis. Among the reasons behind their strong growth are the high degree of liquidity on a global level observed in the past few years (until mid-2007), the increase in the availability of resources on the part of oil-exporting countries, with strong positive credit balances in the external accounts, as well as emerging economies in rapid growth, or the so-called BRICs (Brazil, Russia, India, and China). According to World Bank figures, the Southeast Asian countries have been the least affected in relative terms in response to the tightening of resources that still continues to afflict the global financial markets in the second quarter of 2009.

10 The Economist. September 12, 2008.

11 Prior to the financial crisis and the resulting weakening of asset value, the percentage was 8%, with an upside trend. Estimates by the Finance Ministry indicate that the portfolio could reach a balance equivalent to 11.5% of GDP in 2012.

Conclusions: the private sector will be indispensable in infrastructure development in the next few decades

In the current period, marked by strong aversion to global risk, with higher risk premiums, a reduction in private-sector financing for infrastructure projects is natural. In this environment, the participation of the public sector is essential for launching some key projects, either due to its capacity to spur greater investments or to continue with some already existing ones. Better conditions in the international markets will facilitate the participation of private capital investments, due to growing infrastructure needs and the cost and size of the projects.

At the same time, we should not forget that once the crisis has passed, the trends will resume their course. From a greater participation of the private sector to financing in the capital market, to more efficient systems of fees and toll collection, innovation in financing sources for infrastructure is becoming increasingly more important in a context of growing needs and declining public resources. Under the appropriate conditions, infrastructure projects represent an attractive long-term and high-yield investment alternative, to the extent that some observers have begun to identify them as a differentiated class of assets. However, it should be recognized that in developing economies there is little experience and information to accurately evaluate infrastructure projects (especially the risks), and therefore, alternative formats should be considered to attract more private investment; for example, through programs whereby the government grants guarantees that would offer certainty in terms of a minimum yield and/or the continuity of the project.

Mexico has begun to move in the same direction, with the public-private partnership model that the federal government uses in the National Infrastructure Program, as well as with the recent modifications in the Afore investment régime, which opens the door to financing projects through institutional savers. The speed at which this financing occurs will also depend on the way in which advances are made in the design and operation of the projects, as well as the existence of instruments and methodologies that would allow for adequately measuring the corresponding risks.

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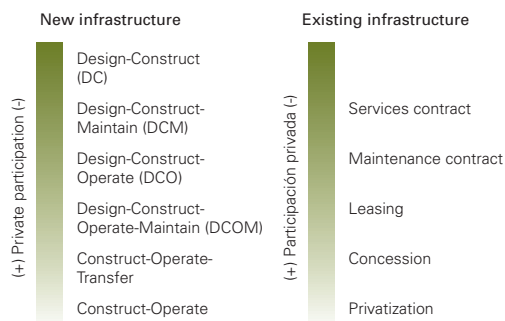
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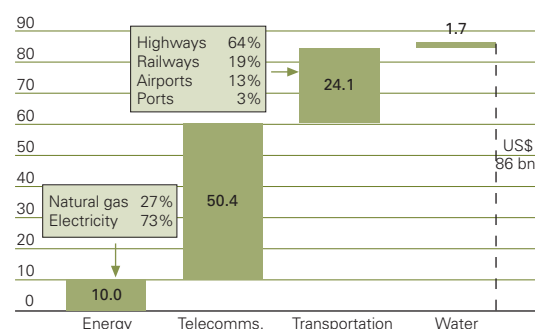
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The Most Common PPA (Public-Private Association) Plans



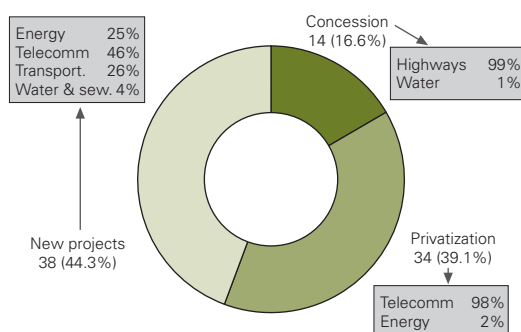
Source: BBVA Bancomer with information from Deloitte

Sectorial Distribution of World Bank Financing for Infrastructure in Mexico* Billions of US\$ Accumulated flows 1990-2007



* Projects involving private participation
Source: BBVA Bancomer with World Bank data

In What Type of Projects are Public-Private Associations Concentrated in Mexico? (Accumulated flows 1990-2007, US\$billions and %)



Source: BBVA Bancomer with World Bank data

Ten years ago, people barely spoke of them, but now, their use has extended throughout the world, and they undoubtedly constitute a strong lever for boosting infrastructure development. This is about the *Public-Private Association (PPA) models*. This article deals with this topic in Mexico with special emphasis on the plan that has been acquiring greater force in recent years: the Service Provision Projects, known as SPP. Their main characteristics, advantages, countries and types of projects are investigated where they are used, as well as their main risks. Also included are a series of considerations that would allow reducing the "learning costs" from their use, so that they constitute a general framework regarding the elements that must be included in their design to ensure their success.

Public private association plans and the Mexican experience

Private sector participation in infrastructure is not new, so, what is the difference between PPA plans and traditional programs, such as concessions or public works contracts? The novelty in the PPA contracts is that the government transfers part of the risks associated with the project to the private sector and the benefits are shared.

Typically, the public private associations involve construction of works by the private sector, together with a concession period for recovering the investment through flows generated by the project, or otherwise from payments made by the government as compensation for the service provided (in the case of hospitals, schools or others where rates do not apply). Government payments are made in terms of the quality of the services rendered, and these can also change throughout the life of the project, which is not necessarily the case in public works contracts. Another characteristic of the PPA plans is that the works do not imply a debt commitment by the government; this implies an important change with other plans such as the PIDIREGAS¹, where the private sector also builds, operates and transfers assets to the government, but there is certainty in the flows and debt guarantee.

Up until the beginning of this decade, private sector participation in infrastructure projects had materialized under diverse plans including financed public works. PIDIREGAS, concessions, privatizations, subrogation or substitution of services, among others. World Bank figures show that private sector investment in infrastructure projects in Mexico accumulated a balance of US\$86 billion between 1990 and 2007, with close to 60% concentrated on telecommunications and barely 4% in water. In transportation, close to two-thirds of the investment has been made on highways, and it is in that area where most of the investment flows are expected in the coming years². (World Bank 2009)

In México, the main PPA plans that the Government will use in the National Infrastructure Program (NIP) consist of concessions of highways in operation, the Asset Development plan (which includes a concession of a highway in operation and a contract to build and

1 Investment projects with a deferred impact on spending.
2 In 2007, the investment amount in highways, US\$5.5 billion, represented close to 90% of the US\$6.4 billion that the country received.

operate a new one) and the Service Provision Projects (SPP), which are based on the construction and operation of the projects during a definite period of time. As per the projects taken into account in the National Infrastructure Program, the Service Provision Projects would be used only in highways (representing up to 43% of the private investment in the sector), although the federal government has also used these for infrastructure construction in the health sector (the High Specialty Regional Hospital of the Bajío Region and in Ciudad Victoria) and the educational sector (the Polytechnic Unit of San Luis Potosí)..

Service provision projects, what are they and what advantages do they offer?

The SPPs are contracts where the government delegates to a private individual or corporation, the provision of a service for a period of time. The service may be offered with new infrastructure (built by the private individual or corporation) or under a concession using assets owned by the government.

Among the characteristics of the service provision projects are that they are based on long-term contracts (15 to 30 years), in which the payment obligations are registered as current expenditures. Prior to its authorization, the project must show that the service to be offered generates a net benefit for society and that greater profitability is being achieved when the private sector provides it. Despite the fact that the service provision can be realized with assets built by the private investor, the direct responsibility lies on the public sector.

Service provision projects provide three important advantages for the government: first, they do not imply debt or an immediate disbursement of resources on the part of the government. The investment is made by the private sector and the payments are made throughout the life of the project, provided that the conditions agreed upon in the contract are met. This automatically frees resources for works which otherwise would not have achieved financing.

Second, the risks are not totally assumed by the government. Generally, the government absorbs those relative to the acquisition of land, legal and administrative aspects (such as the freeing of the rights of way and the permits with government agencies), as well as the changes in the project specifications. The private sector, for its part, absorbs the risks associated with errors in the design or costs, delays in the time of delivery, as well as the efficient operation of the projects, and the quality and maintenance of the works.

Third, in these projects, incentives are generated to improve the quality of the services and the works in general. The advantage of the service provision projects is that there is less probability of delay, because payment begins when the service begins to operate. There is a strong incentive among the private participants to maintain and operate the infrastructure under proper conditions, because the obligation of the flows is linked to the fact that the compensation is carried out under the conditions that were agreed upon. Also, the private sector has more experience and capacity to control the quality of the services that it offers, for example, in the case of health and education. (Gutierrez, 2007).

Private Investment on Infrastructure as per the National Infrastructure Program Billions of pesos*

	Total (bp)	Distribution %	
		Public	Private
Total	1,037	42	58
Telecommunications	309	7	93
Ports	77	23	77
Airports	64	54	46
Railroads	53	55	45
Highways	313	55	45
Potable water, drainage, sewage	168	70	30
Hydro-agricultural and flood control	52	75	25

□ Includes financing via SPP (Service Provision Projects)
* at January 2009 prices
Source: BBVA Bancomer with Finance Ministry data

Private Investment Plans In Highways* Billions of pesos at January 2009 prices

	Awarded, bid or pending bid	Under study	Total
Total	80	78	158
Service Provision Projects (SPP)	40	28	68
Concessions	24	23	48
Asset Development	15	27	42

* Only considers projects promoted by the federal government
Source: BBVA Bancomer with SCT (Department of Communications and Transportation) data

The Profitability of SPP (Service Provision Projects) Depends on the Type of Project

	Investment, mill. of pesos	Value*
High Specialty Hospital of Bajío Area	700	33
Irapuato-La Piedad Highway	925	30
Queretaro-Irapuato Highway	1,581	18
Tapachula-Talisman Highway	731	19
Polytechnic University of S.L. Potosi	285	0.5

* Value for the money %. Compares the benefit for society by doing it via SPP instead of traditional public investment
Source: BBVA Bancomer with Finance Ministry data

The state governments jump on the train

At a state level, the service provision projects plan has aroused wide interest. In the Federal District, the SPP plan has been used in the Hydraulic Pavement Project in the city's interior circuit. In the state of Mexico, a cultural center, a hospital, a highway (the Naucalpan overpass), a bridge (James Watts) and a primary highway system are in the bidding process or bidding is about to open. In Oaxaca, building complexes of government offices called Ciudad Administrativa (Administrative City) and Ciudad Judicial (Judicial City).

A total of 23 states have carried out reforms to the legal framework (eleven of them at a constitutional level) to adapt it for use in service provision projects. At a municipal level, there is also an interest in the SPPs; for example, in garbage collection or the construction and maintenance of road systems, both of local jurisdiction. Important topics to watch will be the definition of the institutions that approve the projects, the conditions for assigning contracts, coordination with the federal government (the Finance Ministry and/or Fonadin) to set medium- and long-term priorities and goals in the development of the works, as well as the administrative units that will provide follow-up on the projects.

It will also be important to ensure that the Finance Ministry will register the annual payments that each state must make for the service provision project item³. This, added to the rating by specialized agencies regarding the internal saving capacity of the states, could allow debt issues on the expected flows of the projects. Even though the above would require a certain maturity of the system, it would help in terms of greater scrutiny on the quality of the projects.

The central elements of the Service Provision Projects

One of the central issues in the SPPs is the cost-benefit analysis, which must show that the project to be developed generates a net benefit for society, which will increase if the private sector provides it. The latter is recognized as value for the money. The cost-benefit analysis is a rigorous and detailed analysis with diverse evaluation parameters (present net value, internal rate of return, expected annual cost, among others), where, in the end, what counts is the criterion that is established to determine the limit based on which the parameters or the project of reference⁴ are acceptable. What is important is that the project is clear and transparent, since the only tool that it has to determine if the project generates benefits or not⁵ in the conditions under which it is established.

Moreover, the project of reference is key for discarding higher costs for the government (and society) or even the recovery of the projects in the medium and long terms. The first evaluation experiences of these projects are proof of this importance: while in hospitals and highways, the profitability of the project can be attractive for the government (it finds relatively high rates of value for the money), this is not necessarily the case in educational institutions. A concrete case is the San Luis Potosi University, which was barely profitable. What would happen if the criteria were lowered at all costs to make the projects justifiable?

3 In particular, it is necessary to modify Article 9 of the Law on Fiscal Coordination to request that the states register with the Finance Ministry the payment obligations derived from Service Provision Projects.

4 Known in English as Public Sector Benchmark.

5 The case could be that the incentive for the government entity (federal, state or municipal) is to carry out the project more than to guarantee its economic efficiency.

Another of the central elements in the service provision projects has to do with the regulatory framework. It is important to have specific legislation for the SPPs given that, at this time, their operation is subject to disperse regulation which does not necessarily adjust to the conditions of the SPPs. For example, an important restriction is constituted by the Law on Acquisitions, Leasing and Services by the Public Sector (LAASP for its Spanish initials), which obliges maintaining the contract conditions unchanged during the entire time the contract is in force. This is restrictive because, in the service provision project, conditions in service provision change over time. The same regulation establishes as a criterion for assigning the contract, the lowest economic offer (at current value) of the payments. However, this does not consider the concept of value for the money⁶.

New legislation has been approved in Congress, and it will come to clear a good part of the limitations of the current legal framework with regard to service provision projects. Among the elements contained in this new legislation are included, among others in the LAASP, mechanisms to avoid rash offers (by setting minimum prices on the projects); the contracting of studies is made flexible, thereby allowing them to be realized without the intermediation of the Finance Ministry and be realized by private parties; the concept of unsolicited proposals is incorporated in the Law to allow private parties to work out studies without a previously existing bidding process, and SPP plans are incorporated in the legislation.

In the Public Works and Related Services Law (Ley de Obras Públicas y Servicios Relacionados), the intention is to eliminate the need to have the rights of way and the expropriation of real estate prior to the start of the projects, which will allow expediting the construction of the works. The criterion of the awarding the most convenient economic proposal is clarified to incorporate the concept of value for money (in which the best offer is not necessarily the least expensive). Also incorporated is the criterion of evaluation of proposals in terms of points and percentages, in substitution of the current one which is only based on whether the requirements are met or not. This is incorporated in the mechanisms of contracting maintenance and operation, since, at currently, only construction is considered.

Incorporated in the Federal Law on Administrative Responsibilities of Public Servants are exonerating causes of responsibility for public servants, basically seeking that the works not be delayed, because there is no one to sign the permits and transactions. In the Federal Penal Code, actions that merit penal action are precisely stipulated, given the current ambiguity in the interpretation of some articles. Also, guiding parameters will be established with regard to the imposition of sanctions, individualizing them according to specific cases. (Cofemer, 2009).

Finally, the Expropriation Law was reformed to include in the construction of public infrastructure and the provision of public services as grounds for public use (reason for expropriation), allowing in such cases the immediate occupation of the property. The term for

Legal System Applicable to SPPs (Service Provision Projects)

- Federal Budgetary and Financial Responsibility Law
- Regulation of the Federal Budgetary and Financial Responsibility Law
- Law on Acquisitions, Leasing and Services of the Public Sector
- Manual of Budgetary Regulations for the Federal Public Administration
- Rules for the realization of SPPs
- Guidelines for preparing pre-projects of the expenditures budget and coordination with Finance Ministry and Interior Ministry
- Criteria to determine the annual budgetary allocation limits applicable to SPPs
- Guidelines for the cost-benefit analysis of SPPs
- Methodology for comparison of bids
- Official Circular Letter 801.1.328
- Official Circular Letter 801.1.328

Source: BBVA Bancomer with Chamber of Deputies data

⁶ The most profitable project for society is not necessarily the one that implies lower payments to the contractor but the one that offers the greatest value for the money.

indemnification is reduced and, perhaps most important, objections are limited only to the amount of indemnification, that is, the suspension of the expropriation is not admitted, not even through a "writ of amparo" injunction.

To be considered...

As per the experience obtained in the service provision project plans, some key elements for the success of the projects are: first, an appropriate assignation of the risks⁷; second, to have complete executive projects that will reduce the cost of administrative processes and transactions; and, third, experience both on the part of the firms and the government agencies in charge of the development of the project (OECD 2008).

Infrastructure projects should be sufficiently flexible to incorporate the changes in the environment that are produced throughout the life of the projects. But this is not always the case. World Bank figures show that the renegotiation of the conditions stipulated in the contracts occurs in 50% of the cases (80% in water projects and 60% in transportation), and the average time for said renegotiation, as of the time of delivery of the concession, is of only 2.2 years. (Guasch, 2004).

There are different elements that exist which have a bearing on the performance of service provision project plans for the development of infrastructure: planning and design, level of competition in the market, legal framework, as well as management in the operating stage. To consider all these factors from the standpoint of the "life cycle" would prevent making the mistakes that, with greater frequency, lead to failure in the projects: little clarity in the goals, an excessive focus on the transaction with insufficient attention to the operation, inadequate assignment of risk, as well as the lack of institutional capacity for working out the projects (Deloitte, 2007).

As a general rule, the planning phase must include the design and financial viability of the project, communicate the benefits, as well as define the government's role and responsibility based on the legal regime. In the transaction phase, it should be taken into account that the best bidder is the one that offers the highest value to the project, not necessarily the lowest cost. The incentive for the participants to propose rash offers should be eliminated, which, in the end, would force a renegotiation in bilateral terms and in which the contractor stands in a better negotiating position (Guasch, 2004). Similarly, adequate control mechanisms should be set in this phase to manage contingencies that may have a bearing on disproportionate rises in costs, delays in construction works and legal proceedings.

Finally, in the construction and concession phase, the government should take into account that it continues to be responsible for the projects. To this end, it should provide follow-up to the management and operating aspects of the projects during their useful life, which requires the development of capable and specialized teams for this purpose, and to guarantee their permanence over time.

⁷ In general terms, these must be assigned to the party that is best empowered to improve them. Typically, the private sector would be responsible for the risks associated with the delivery times and specifications agreed upon, as well as the costs of the project. In turn, the public sector must assume the risks of satisfaction and acceptance on the part of the users, as well as the possibility of non-anticipated expense requirements.

There is still much to be done in terms of learning and developing with regard to service provision projects, and some steps are being taken based on the first experiences to improve and make their operation more efficient, both from the standpoint of the legal framework and the institutional capacity for developing projects. It is also fair to mention that the plan is novel and has made it necessary to learn by doing. In any case, the recent legal reforms, both at a federal and a state level are promising. Also noteworthy is the creation of a joint fund between the public and private sectors for the financing of studies⁸, as well as is the technical support that the Inter-American Development Bank will provide⁹. Other topics on which there should also be progress is to have a project portfolio in order to develop them throughout time, as well as transparent criteria in the evaluation and awarding of the projects (SCT, Department of Communications and Transportation, 2008).

It is also clear that, in some aspects, the development of the projects should be improving. For example, to provide completed executive projects to the bidders, which would save time in obtaining rights of way and in environmental negotiations. This would also reduce the preparation time of the bids made by bidders, as well as an easier and more expedite evaluation of the technical bids.

The operating efficiency of the contracts in the operational stage has yet to be seen. Efficiency also has to be verified, with regard to measuring performance, solving controversies, complying with annual maintenance programs, among others. At a general level, an important lesson for the government is the need to prepare a global estimate of the cost of the plan by sector and in line with the optimum budget ceiling, so as to send clear signals to the market. (Ibañez, 2008)

Other sectors in which service provision projects could be applied include water, sewage, energy, urban and suburban transportation, public lighting, public security, public buildings, and even prisons. The federal government analyzes the possibility of granting in concession to the private sector a good part of the services for jails that are to be built in the coming years, including food, laundry, education, sports and labor training (Aguilar and Hernandez, 2009).

Conclusions: the key Service Provision Projects for infrastructure development

The association with the private sector will be the basis for infrastructure development in the coming years. In particular, service provision projects are expanding on a world level and in Mexico there is marked enthusiasm for using this plan at a federal, state and municipal level. Undoubtedly, the SPPs are a promising alternative to speed up the pace and overcome the lags, not only in the so-called economic infrastructure, which includes highways, airports and electric power plants, but also in the so-called social infrastructure which includes

⁸ Fund for the financing of infrastructure project studies (FEPI for its Spanish initials). It consists of P\$200 million provided practically in equal parts between the public and private sectors, to finance studies for projects of the three government orders (federal, state and municipal).

⁹ Through this agreement, called Infrafund, the IDB will offer the Fonadin assistance for evaluating, structuring and prioritizing the projects, as well as conducting the required pre-investment studies.

education, health and social readjustment. The speed with which this model of public-private association has developed has forced learning while doing. Nevertheless, it is clear that to develop service provision projects successfully, sufficient institutional capacity and talent should be created to provide a comprehensive vision to the projects so that they meet the economic and social goals, and the conditions to manage the projects throughout their different stages. Progress in the legal and institutional framework is key to guarantee the development of service provision projects and avoid repeating the errors made in the past.

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Learning from Experience

Not all infrastructure projects have been successful. Delays and higher than anticipated costs are the most common problems and they occur frequently. Here are some examples of projects where the results have been far from what was projected, as well as some factors that have been present in failed projects.

Not all that glitters is gold

The English Channel Tunnel. This project, which began in 1985, consisted of linking France with the United Kingdom through a 50.5 kilometer long, 40 meter wide underwater high-speed railway line. Its cost, US\$21 billion, was double what had been projected initially. It did not generate the cash flows that were expected, and therefore bankruptcy protection was sought in 2006. An investigation undertaken by the regulatory agency, the Strategic Rail Authority, concluded that the economy would have been better off had the tunnel not been built. It was not until 2008 that the administrating company for the tunnel, Eurotunnel, stabilized its financial situation, after several restructurings and losses for investors and creditors. What failed? Basically, it was that the route faces heavy maritime competition, with a wide array of companies that offer transportation services and advanced technology that make shipping very efficient in terms of cost (Pavoni, 2008)

Sidney Opera House. Projected in its beginning (1957) at a cost of US\$ 6.6 billion and to be completed within six years, the final price tag was thirteen times higher, US\$86 billion, and construction was concluded nine years behind schedule (1973). This is the second case in history in which the final cost massively exceeded expectations, only behind the Suez Canal (1856-1869), where the final price tag was 1500% greater than what had been budgeted.

The case of FARAC in Mexico. In the 1980s, an ambitious highway program was launched in Mexico based on private concessions, involving a total of 4,000 kilometers of roads. From the beginning, the plan contained some flaws: the concession was granted to those who offered the shortest term; the banks did not grant credits with maturities beyond 10 years, and interest rates were relatively high; there was no experience in the preparation of demand studies; and finally, the projected vehicular traffic flow was guaranteed in the concession title. The result was that the costs exceeded projections, and as a result, the tolls established by the concessionaires

were too high and the demand projections were not met, in some cases falling short by 60%. To complicate the situation, the economic and financial environment by the mid-1990s weakened the companies' solvency, in addition to generating a contraction of demand. In mid-1995, the Concessioned Highway Rescue Trust (FARAC for Fideicomiso para el Rescate de Autopistas Concesionadas) was established, through which the government recovered 23 of the 52 concessioned roads. The cost of the rescue program was close to 60 billion pesos, or around US\$7.60 billion dollars (CEFP, 2007).

Warning signs

A World Bank study that examined close to 3,800 infrastructure projects with private sector participation in developing economies between 1990 and 2006 identified a series of factors that commonly come together forcing the cancellation of some projects¹. A total of 4.7% of the projects (4.9% of the committed investment) were canceled during the process; on average, the cancellation occurred five years after the corresponding contract was signed (World Bank, 2009).

On a sectorial level, the projects with the highest rate of cancellations (close to 9% of the total) corresponded to those related to potable water and sewage. In contrast, the natural gas and electric power generation plants had the lowest rate of cancellations. Ports and airports also had relatively low cancellation levels.

According to the study, there are some factors that tend to increase the risk of projects being cancelled. Water-related projects showed an increase of around 9% in terms of the probability of cancellation, rising from less than 5% to nearly 14%. Other factors that have a bearing on cancellations are macroeconomic shocks (identified through abrupt currency depreciations), the origin of the capital that finances the project, and the size of the project. These results come as no surprise. In the case of water projects, relatively low levels of recovery and little political support (given a negative perception of the involvement of private sector participants in this activity) could explain the results. At the same time, macroeconomic shocks boost the cost of financing the projects (due to currency depreciation and interest rates), while they reduce demand. When the time comes to decide

¹ A project is considered to be cancelled if, before the term of the contract, the private investor has transferred equity in the project, has abandoned it, or has stopped construction for a period greater than 15% of the specified duration of the contract.

whether or not to abandon a project, a foreign financial institution faces fewer pressures than a local entity. Finally, the financial burden for the government increases with the size of the projects, and therefore in periods of crisis projects could face greater difficulties to survive.

Conclusions

In an environment marked by a global recession and a shortage of financing, it is clear that infrastructure projects will face greater challenges to be successfully carried out. Taking into account the experiences of the past, it is important to eliminate unnecessary risks, such as relaxing the criteria for approving contract agreements, or accepting reckless proposals that require renegotiations (or rescue programs) halfway through

the life of the agreements. Minimizing the risks can be the surest way of taking advantage of the benefits of private investment in infrastructure once international financial stability returns.

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The Potential of Infrastructure Investment for Afores in Mexico

In recent years, in various countries throughout the world, institutional investors such as investment and pension funds have been a key factor in financing infrastructure. In Mexico, various legal modifications in force since 2008 allow the Retirement Fund Administrators (Afores) to invest in this type of assets. This article analyzes the financing potential that this new investment regime offers, as well as the challenges that must be considered to achieve a double benefit. On the one hand, it expands the financing sources for the different infrastructure projects and on the other, it facilitates appropriate diversification of the investments so that pension holders obtain a return in accordance with the risk assumed by the projects. It is clear that the benefit can be mutual.

The assets managed by the Afores and their potential importance

At the close of the first quarter of 2009, the balance managed by the Afores in Mexico represented 8% of GDP, and conservative projections indicate that this could rise to 16.5% in 2012. The resources of the Afores, channeled through the Siefors (Specialized Retirement Fund Investment Companies) finance 26.5% of the total long-term private debt issued in Mexico.

In the infrastructure sector almost all these resources are allocated to the financing of highways. The Finance Ministry (SHCP) has estimated that approximately 6% of the total Siefors portfolio is invested in instruments that finance infrastructure projects, which in September 2007 was equivalent to approximately 0.5% of GDP. According to conservative SHCP estimates, if the Siefors were to maintain the composition of their portfolios, their investment in instruments to finance infrastructure projects could rise to more than 1% of GDP in 2012.

Recent modifications to the legal regime

The modifications to the investment regime for Siefors in 2007, which are in force as of March 31, 2008, can spur a greater investment of resources in the infrastructure sector. The investment regime now contemplates a multi-fund model with five Siefors and two new instruments that allow for directly channeling part of the retirement funds toward infrastructure projects and companies: structured instruments and infrastructure and real estate trusts (Fibras). Four of the five Siefors can invest in these projects, in proportions that range from 1% to 10% of the portfolio in the case of the structured instruments and from 5% to 10% in the case of Fibras (the trusts).

The structured instruments that may be acquired by the Siefors are relatively sophisticated financial products that incorporate the use of derivatives but, in order to be selected, must guarantee their nominal value upon maturity. In this sense, the regulatory framework seeks to protect investors. The return on these instruments can be very attractive and may be derived totally or partially from their link to other assets; that grant rights over their yield and/or proceeds through a trust, which in turn issues stock certificates.

Pension Funds can now Finance Infrastructure in Mexico

Maximum % share in available instruments

	Fixed income	Foreign instruments	Variable income	Fibras	Structured Instruments
Basic 1	60	20	—	—	—
Basic 2	59	20	15	5	1
Basic 3	50	20	20	5	5
Basic 4	37.5	20	25	10	7.5
Basic 5	30	30	20	10	10

Source: BBVA Bancomer with Amafore data

The structured products are an investment vehicle used by many pension funds around the world that allow participating in infrastructure projects from their initial investment phase; their main advantage is that they provide greater certainty over the cash flows of the project in the long term, from the start of their structuring. In Mexico, the approved regulation provides that within a structured instrument, several companies or projects can be financed from their initiation or through reopenings, through new issues. In fact, structured instruments in the format of protected capital notes have been used by the Siefors since 2002; they have participated with investments in variable-income securities. In these notes, the principal and a minimum yield on the capital investment, are protected by a fixed-income instrument, with the possibility of obtaining an additional return derived from the performance of variable-income securities that traditionally, over a long-term horizon, has resulted attractive.

The Fibras are negotiable instruments or securities issued by trusts that are engaged in the acquisition or construction of real estate in Mexican territory that are destined for leasing or the acquisition of the right to perceive income from the rental of said goods. The Fibras are investment vehicles that allow for the securitization of the rental income of the real estate as well as its increased equity value. This last characteristic is the main difference between the securitization of rental income and a Fibra. Up to this time there have been few issues of Fibras, but the potential in the medium term for this type of instruments is very important.

The operation of instruments linked to infrastructure is somewhat restrictive

For companies engaged in infrastructure projects to have access to these financing mechanisms, they must be incorporated as Sociedades Anónimas Promotoras de Inversión (SAPI) (Investment Promoter Corporations) and create a corporate government.

Among the requisites that structured instruments must comply with to form part of the investment portfolios of the Siefors is that these must be valued at market prices; its debt component on a daily basis, and every six months its variable component, through an independent appraiser. The important issue here is that, due to its duration, the debt instrument could be more sensitive than other assets to short-term financial volatility. In times such as the present, of strong volatility and aversion to risk, this could limit investment in this type of instruments.

In the case of Fibras, among the applicable requisites is that at least 70% of the equity is invested in real estate; the goods that are acquired will be destined only for leasing and will be sold during a minimum term of four years; finally, no individual investor may own more than 20% of the instruments.

And the scheme of operation and some characteristics of the instruments are not free of risk

Despite their potential as a source of resources, the new instruments that allow Siefors to invest in infrastructure, have some risks that must be considered to increase their appeal, expand their penetration in the market and with this, facilitate their effectiveness as investment instruments. For example, in the case of structured instruments, it must be taken into account that, in the absence of a secondary market for stock certificates, the liquidity of the instruments could be relatively low. Therefore, even though debt instruments are a guarantee over stock certificates, it is not possible to guarantee that their liquidation will be fast and practical. On the other hand, the valuation of the variable part of the structured instruments is dependent on various factors that range from the experience and technical capacity of the trustor to operate and manage an infrastructure project to the volatility of the variables linked with the projects, such as for example, the exchange rate, inflation, the tax regime and the regulatory framework.

In the case of the Fibras, up to this time, the main element of risk is possible double taxation in the event of the sale of the real estate, which is derived from the lack of uniformity at the national level between federal and local (state and municipal) tax codes. While in the federal sphere there is a tax regime applicable to Fibras, at the state level, both the transfer of the rights of a trustee and the transfer of property are considered an "acquisition" and are subject to a tax on the acquisition of real estate. Thus, the sale of Ordinary Share Certificates (Certificados de Participación Ordinaria, CPOs) of the Fibras, which give its holders the right to a part of the real estate, could be subject to that tax. The solution would be to reform the tax codes at the local level so that the sale of the CPOs be considered only as a sale of negotiable or credit instruments that do not represent ownership of goods.

Finally, and in a capacity applicable to both instruments, there is the fact that in Mexico, the experience in terms of the evaluation of infrastructure projects is relatively scarce, both in the public as well as the private sector, Undoubtedly, contributing to the creation of a broad base of indicators and the formation of specialists that can analyze this type of projects with very specific risks will be the next task facing potential issuers, investors, and authorities for the benefit of the development of this type of project. These needs must be met in different ways: for example, a reinforcement and specialization of the very structure of the Afores, and the appearance of market specialists for this type of instruments and independent project appraisers.

The advances, up to now have been limited, but in the right direction

Up to now, it must be said, the steps taken to finance infrastructure through structured instruments and Fibras are very few. In the Mexican Stock Exchange only one issuer has been registered that placed these certificates for an amount of 1,650 million pesos (1.65

billion pesos), essentially among institutional investors (probably Afores)¹. Moreover, the infrastructure works that up to now have been financed have to do almost exclusively with highways, which is positive, but other sectors, such as energy and water, could also have a high potential.

Conclusions: it is necessary to set the bases for sustained growth

Given the amount of the resources that they manage and the flexibility of their investment regime, the Siefores appear to be an important institutional investor and the resources derived from retirement funds an important source of financing for the country's infrastructure projects. Since the investment vehicles and projects are novel, it will be necessary to work on different aspects that consider the reinforcement of the construction and operation of the financial instruments linked with infrastructure. In this manner, there will be an appropriate combination of elements to make them attractive investment instruments. If this is not dealt with, these issues could eventually become "bottlenecks" in the medium term when we return to normal times in the financial markets, with lower levels of aversion to risk. At that time the financial markets could come to perceive their benefits and could incorporate them in their investment portfolios.

In any case, the experience of other countries is highly promising and care would only have to be taken that at all times, the participation of the Siefores in these projects and instruments would be voluntary and guided by clear principles of risk-return and fiduciary responsibility of the Afores toward their account holders, the owners in the final instance of the resources in the Retirement Savings System (Sistema de Ahorro para el Retiro) and for whom the investments in infrastructure as in any other asset must result in a benefit once it is adjusted due to risk. With this, the bases will have been established for the sustained growth of investment in infrastructure through institutional investors, an important task, but one that can result in clear benefits for participants.

References

(Consar) Comisión Nacional de Sociedades de Ahorro para el Retiro (National Commission of Retirement Fund Administrators) (2007), Circular 15-20, Modifications and additions to the General Rules that establish the investment regime to which the specialized retirement fund investment companies must be subject. Daily Gazette of the Federation (Diario Oficial de la Federación) August 1, 2007.

¹ This refers to Agropecuaria Santa Genoveva S.A.P.I de C.V, which placed this amount in June 2008. The certificates, issued at a 20-year term, received a triple A grade, guaranteeing the capital with debt instruments and the possibility of additional yields with forestry assets.

III. The Ten Most... and the Others

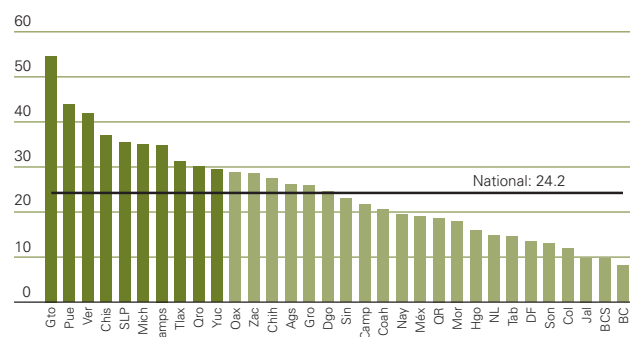
- How good is the quality of public spending?
- In some activities, there is an urgent need for infrastructure spending to overcome the lags accumulated over decades
- Highways are the sector that has received the biggest share of investment in the past few years

A. Public Works and Government

In terms of the quality of spending, accountability remains a pending issue, especially on a state and municipal level

Public Works

% of state spending 2007*

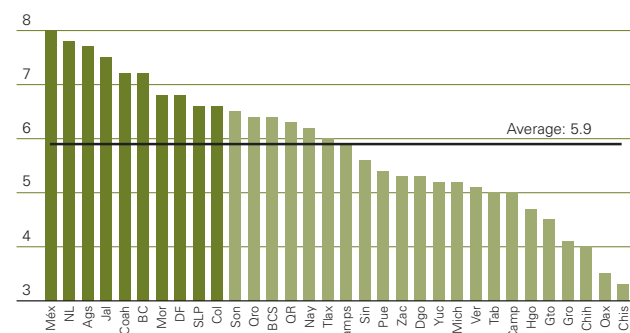


* In the case of Col, Chis, Dgo, NL, Oax, Pue, Tlax, and Ver the data are from 2006
Source: BBVA Bancomer with INEGI data

Isn't it about time to provide more thorough monitoring of the allocation of public resources?

Allocation of Resources* (AR)

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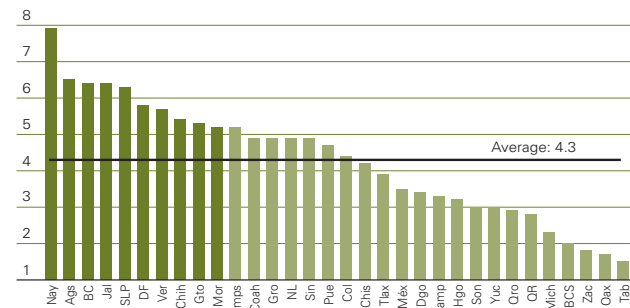


* Includes spending allocated to reach levels of achievement in health, education, and basic services
Source: BBVA Bancomer with Coparmex data

... as well as in strengthening the culture of transparency and accountability

Culture of Transparency and Accountability

Index

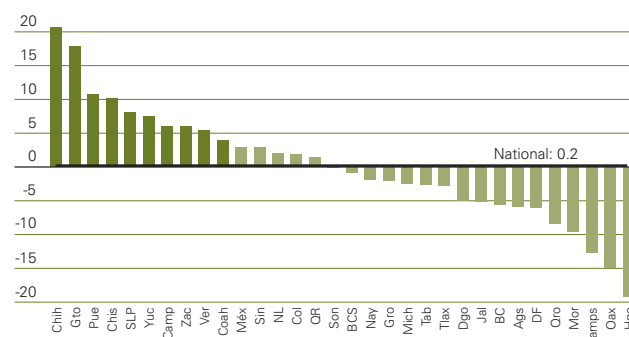


* Considers consultations both direct and via Internet in the three branches of government, autonomy of the local units of the Federal Institute on Access to Information (IFAI), timely, useful, precise, comprehensible, thorough, complete, and circumspect information.
Source: BBVA Bancomer with Coparmex data

Half of the country has improved, relatively speaking, the quality of spending ... and the rest?

Public Works in Total Spending: 2007 vs. 2001

Absolute difference in percentage points, 2007 vs. 2001

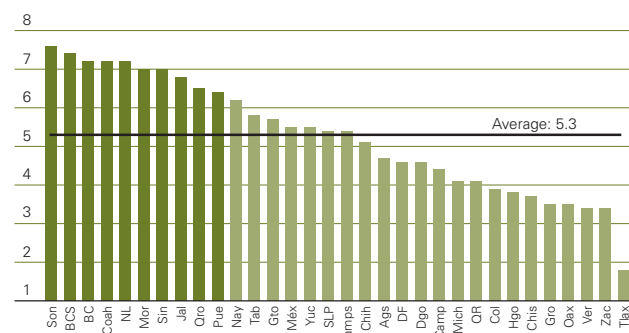


* In the case of Col, Chis, Dgo, NL, Oax, Pue, Tlax, and Ver the data are from 2006
Source: BBVA Bancomer with INEGI data

... that would necessarily be associated with greater professionalism in government

Governmental Professionalism*

Index

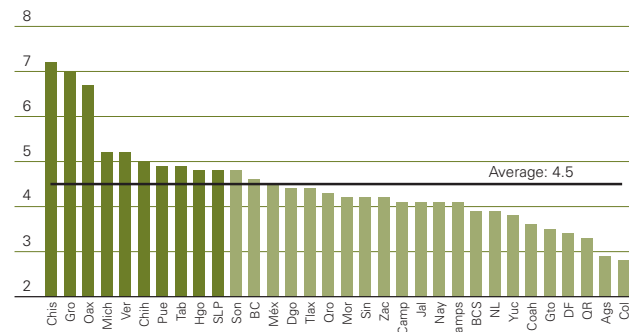


* Includes: development plan, state of the nation report, public accounts, management of resources, clarity on the situation and on priorities, allocation and budget control, resolving problems, and administrative behavior
Source: BBVA Bancomer with Coparmex data

Although it should be taken into account that not all the states face the same conditions

Difficult Conditions*

Index



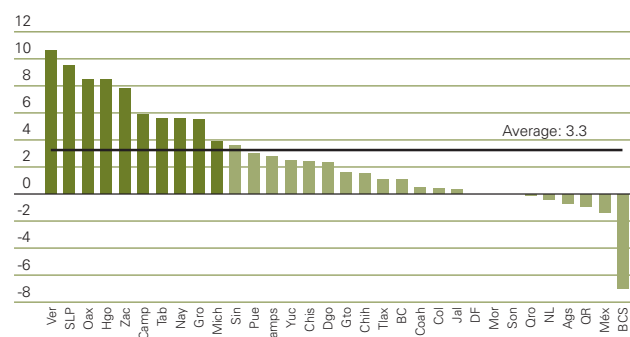
* Economic, social, security, infrastructure, political, climatic, and geographical.
Source: BBVA Bancomer with Coparmex data

B. Potable Water, Sewage, Water Treatment

The effort to increase potable water coverage has been considerable

Advances in Potable Water Coverage

% change, 2007 vs 2000

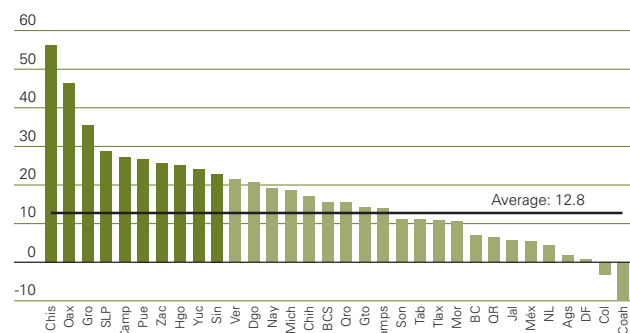


Source: BBVA Bancomer with National Water Commission data

A similar account can be told concerning sewage systems

Advances in Sewage System Coverage

% change, 2007 vs. 2000

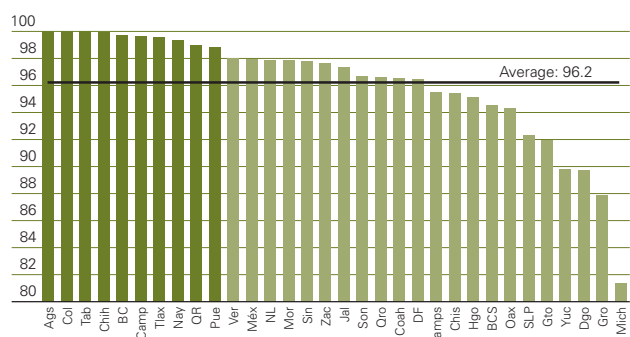


Source: BBVA Bancomer with National Water Commission data

Have you ever experienced or heard of “Moctezuma’s revenge?” This could be the reason (and Moctezuma has nothing to do with it)

Total Disinfection Rate

% of water supplied, 2007

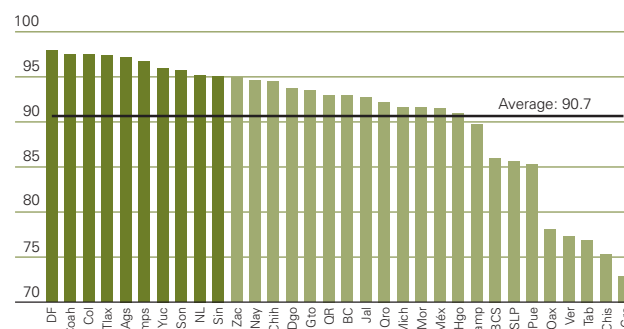


Source: BBVA Bancomer with National Water Commission data

... although the gap is still wide

Percentage of the Population with Access to Potable Water

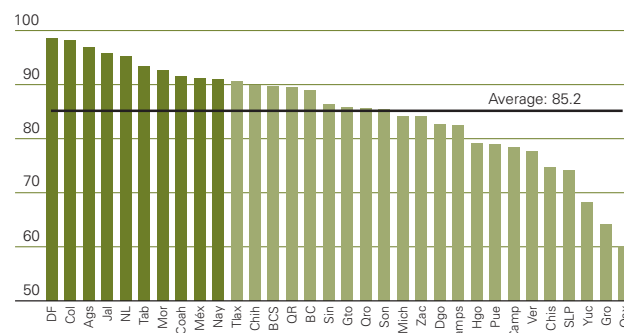
%, 2007



Source: BBVA Bancomer with National Water Commission data

... where the disparities are even greater than in the case of potable water

Percentage of the Population with Access to Sewage Systems. %, 2007

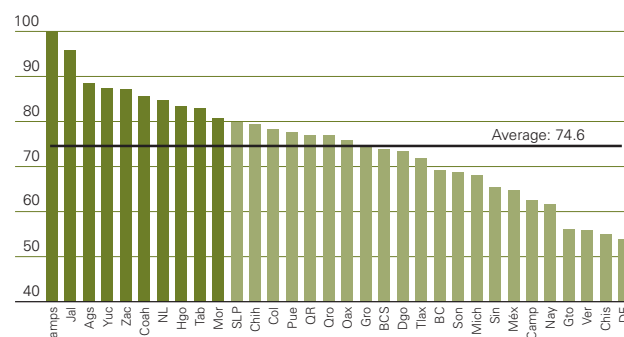


Source: BBVA Bancomer with National Water Commission data

Is it fair that the state that most consumes (and wastes) water is the one that least treats or processes it?

Stock of Residual Water

% of installed capacity, 2006



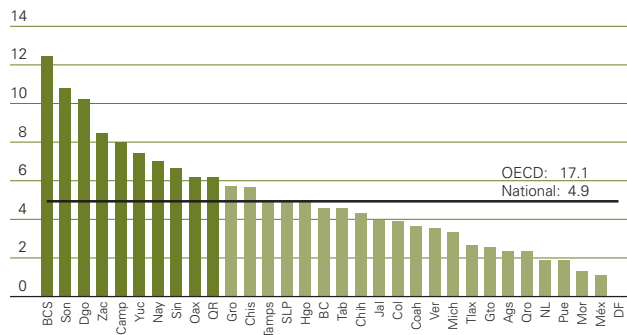
Source: BBVA Bancomer with National Water Commission data

C. Highways

The degree of highway infrastructure does not correlate with the level of economic development, and the country is still far from the OECD average

Highways per State

Km/1,000 inhabitants, 2007

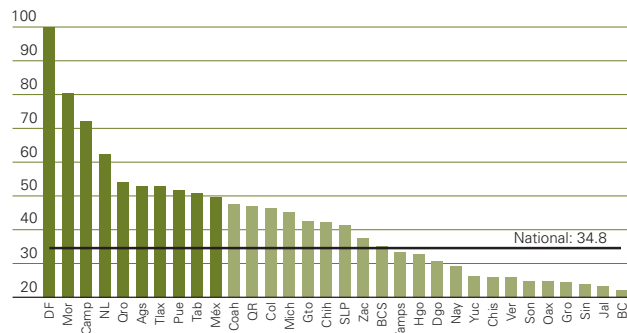


Source: BBVA Bancomer with SCT (Department of Communications and Transportation) and World Bank data

Only one third of the country's highways are paved

Kilometers of Paved Highways

% of total, 2007

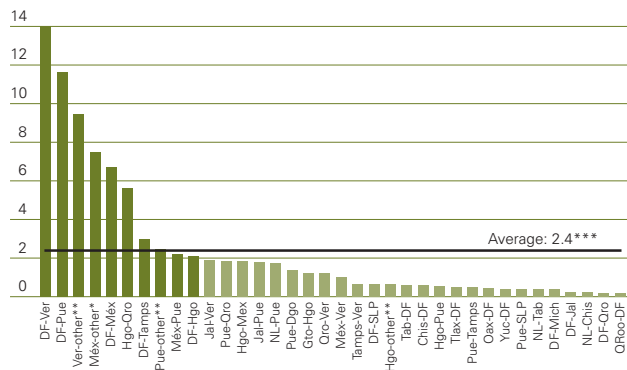


Source: BBVA Bancomer with SCT data

The Mexico City-Veracruz highway carries the most freight; perhaps for that reason its strong deterioration

Highways with the Greatest Movement of Freight

Thousands of tons per day, 2003

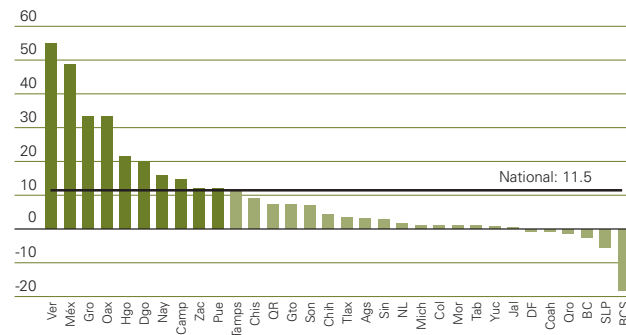


* Two-way ** Connections to states other than the Federal District
 *** Only numbered stretches of highways
 Source: BBVA Bancomer with Mexican Institute of Transportation data

Source: BBVA Bancomer with Mexican Institute of Transportation data

Although it is necessary to recognize the effort in some states to close the gap

Increase in the Highway Network: 2007 vs. 2000

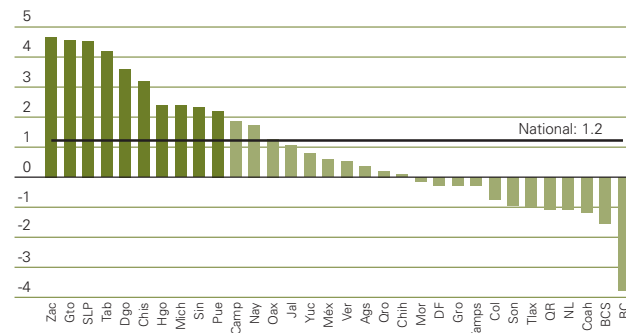


Source: SCT

Hasta antes del PNI, las carreteras pavimentadas habían registrado un crecimiento modesto

Growth in Paved Highways

Average annual growth, %, adjusted by population, 2005 vs. 1995

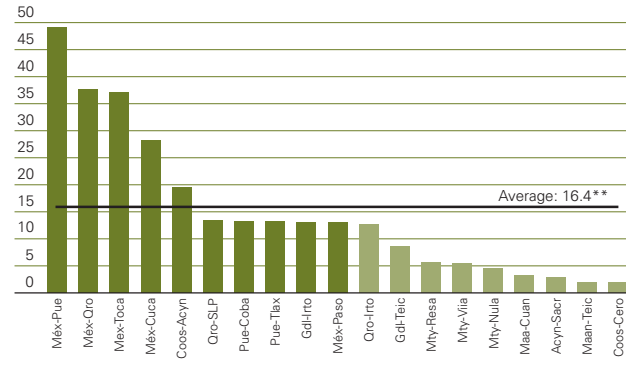


Source: BBCA Bancomer with INEGI and SCT data

The vehicular traffic flow on highways with access to the Federal District underscores the urgent need to decentralize economic activity

Toll Highways with the Highest Vehicular Traffic Flows

Thousands of vehicles per day, annual average*, 2003

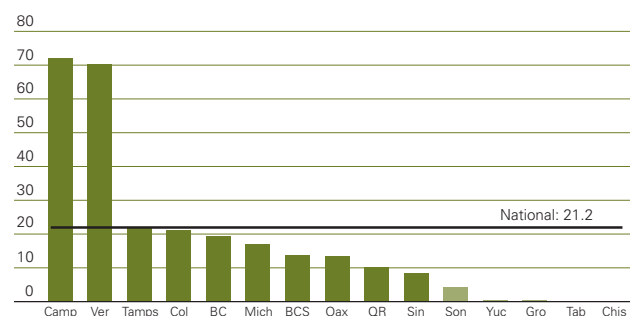


* Two-way ** Only numbered stretches of highways
Coos, Coatzacoalcos; Acyn, Acayucan; Acyn, Acayucan; Coba, Córdoba; Cuca, Cuernavaca;
Toca, Toluca; Paso, Pachuca; Cero, Villahermosa; Sacr, Salina Cruz; Irto, Irapuato; Teic, Tepic;
Resa; Reynosa, Viia, Cd. Victoria, Nula, N. Laredo; Cuan, Culiacán; Maan, Mazatlán
Source: BBVA Bancomer with Mexican Institute of Transportation data

D. Ports and Airports

Campeche and Veracruz handle 50% of the national maritime cargo

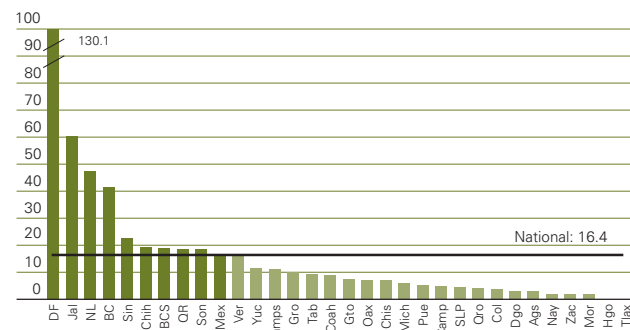
Total Movement of Port Cargo per State
Millions of tons, 2007



Source: BBVA Bancomer with SCT data

All alternatives for decentralizing air traffic in the Federal District are welcome

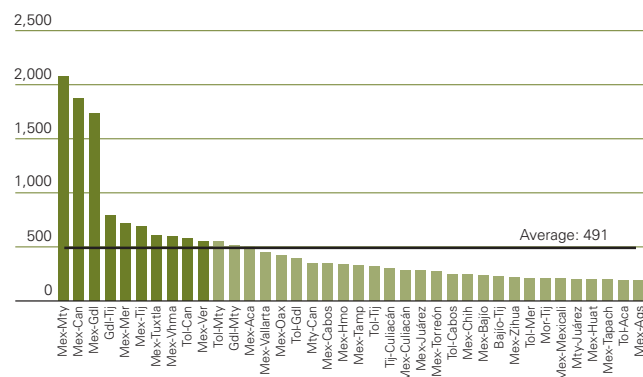
Volume of Regular National Flights
Thousands, 2007



Source: BBVA Bancomer with SCT data

One out of every five airline passengers travels in the routes from Mexico City to Monterrey, Cancun, and Guadalajara

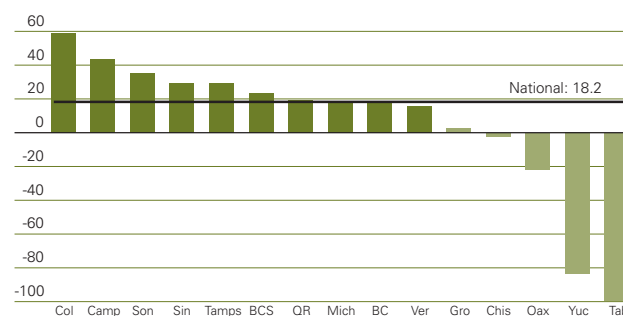
Most Traveled Airline Routes
Roundtrip passengers, thousands, 2008



Source: BBVA Bancomer with SCT data

Some ports are clearly experiencing growth... and others not so much

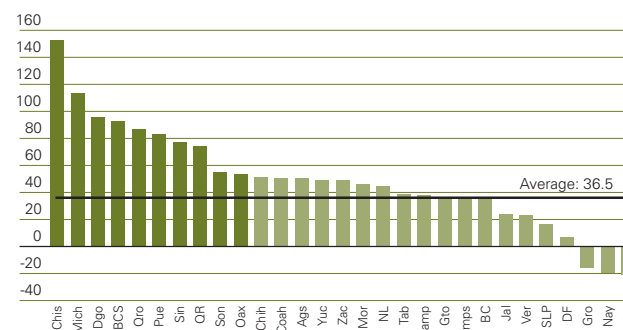
Increase in Cargo Shipping in Ports
2007 vs. 2002, %



Source: SCT

The low-cost airline model has helped to increase the number of passengers traveling by plane

Average Number of Passengers in Regular National Flights
% increase, 2007 vs. 2000

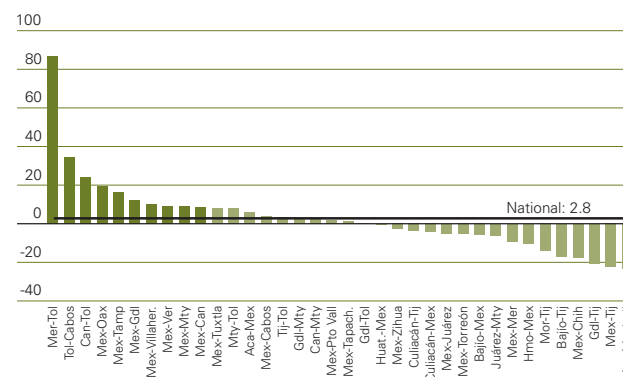


Note: The Toluca airport began its operations after 2000 and regular flights do not fly in or out of Hidalgo and Tlaxcala.

Source: BBVA Bancomer with SCT data

... and Tijuana has been strongly affected in this crisis

The Growth in Airline Traffic is Tied to Economic Activity
% change in passengers, selected routes*, 2008



* Transport 67% of the total number of passengers on a national level
Source: BBVA Bancomer with SCT data

IV. Opportunities

- The federal budget for infrastructure in 2009, around 600 billion pesos, is the highest in history. What activities will it be concentrated on?
- What amount of resources is being considered for each state in highways, water, ports and airports, electricity and hydrocarbons (oil and gas)?
- Which are the federal government's key projects this year?

Main Physical Investment Projects in the 2009 PEF (Federal Government Expenditures Budget): Capital Investment by Large Sectors

- With new legislation, independent advisors and some flexibility in its contract agreements, 2009 could be the year that marks the takeoff for investment in the oil industry. At least the budget that it has been assigned, almost 40% of the total capital investment, would suggest this.
- The urban development programs, complementary to housing, will be the second priority, with a budget equivalent to 18%. In third place are highways, where investment has not stopped and its budget represents around 10% of infrastructure investment.

Capital Investment

	Millions of Pesos	Share %
1 Government	23,211.1	3.9
2 Social Development	166,131.8	28.1
0 Education	17,649.9	3.0
1 Health	18,902.1	3.2
2 Social security	2,190.0	0.4
3 Urbanization, housing and reg. develop.	108,142.5	18.3
4 Water and sewage	18,474.4	3.1
5 Social welfare	772.1	0.1
3 Economic Development	402,520.0	68.0
0 Energy	267,943.2	45.3
Electricity	40,452.1	6.8
Hydrocarbons	227,491.1	38.4
1 Communications and Transportation	62,065.3	10.5
Highways	50,351.8	8.5
Ports	3,254.2	0.5
Airports	700.0	0.1
Railroads	6,148.1	1.0
Communications	63.9	0.0
Others	1,547.4	0.3
2 Agricultural, Livestock and Forestry Development	12,445.0	2.1
3 Labor Matters	503.9	0.1
4 Corporate Matters	9,483.8	1.6
5 Financial Services	37,741.7	6.4
6 Tourism	1,478.7	0.2
7 Science and Technology	5,650.0	1.0
8 Agrarian Matters	50.3	0.0
9 Sustainable development	5,157.3	0.9
NET: Contribution to ISSSTE and subsidies	503.0	0.1
Total	591,862.9	100.0
<p>* Includes physical and other investments PEF Presupuesto de Egresos de la Federación (Federal Government Expenditures Budget) Source: SHCP (Finance Ministry)</p>		

Main Physical Investment Projects in the 2009 PEF (Federal Government Expenditures Budget): Potable Water and Drainage

Capital Investment

	Millions of Pesos	% share
Jalisco	1,401.4	13.40
Tabasco	914.0	8.74
Guanajuato	613.9	5.87
Hidalgo	377.4	3.61
Tamaulipas	350.0	3.35
San Luis Potosí	337.6	3.23
Sinaloa	281.4	2.69
Colima	257.0	2.46
Distrito Federal	206.8	1.98
Nayarit	189.5	1.81
Coahuila de Zaragoza	169.9	1.62
Veracruz	107.8	1.03
Chihuahua	93.7	0.90
México	88.8	0.85
Yucatán	70.1	0.67
Michoacán de Ocampo	50.1	0.48
Guerrero	48.4	0.46
Durango	30.0	0.29
Morelos	22.7	0.22
Oaxaca	20.8	0.20
Baja California	2.7	0.03
Quintana Roo	2.0	0.02
Others	4,821.4	46.11
National	10,457.3	100.00
Total	18,474.4	100.0
Water and sewage	10,457.3	56.6
Others	8,017.1	43.4

Others Considers investment in maintenance of the states. Also includes investment in more than one state.
Source: Prepared with data from the 2009 PEF (Federal Government Expenditures Budget)

- In 2009 federal investment will be 18.4 billion pesos, an amount equal to that of 2001-2005.
- Most of the physical investment is concentrated in three areas: 34%, potable water, sewage and cleanup in urban areas; 14%, treatment of residual waters; and 11.5%, the Túnel Emisor Oriente (East Tunnel Transmitter) and the Atotonilco project.
- The Valley of Mexico Basin (Cuenca del Valle de México) displays one of the lowest indices (6%) in the country in the treatment of residual waters, compared with an average of 40% at the national level.
- The primary and secondary networks of potable water present leakage levels of up to 40%, and the dams that supply the Cutzamala System show a deficit of between 15% and 20%.
- The works to be built in Jalisco (the El Ahogado and Agua Prieta plants) seek to cover 100% of the residual water treatment in the Guadalajara metropolitan area.

Main Physical Investment Projects in the 2009 PEF (Federal Government Expenditures Budget): Communications and Transportation

- In contrast with other sectors, the progress in highways in general is advancing in line with the times projected in the National Infrastructure Program.
- In 2009 the approved budget will allow the use of 49 billion pesos in resources, the highest figure in history.
- Up to now, there is no high-specification highway connection joining the Pacific with the Atlantic, although the intention of the current administration is to develop six routes: Mazatlan-Matamoros; Manzanillo-Tampico; Altiplano; Mexico-Tuxpan; Acapulco-Veracruz; and Circuito Transismico.
- In the Mazatlán-Matamoros transversal, the Puente Baluarte (Baluarte Bridge) between Durango and Sinaloa is particularly outstanding for being the highest and longest structure in Latin America, and saving three and one half hours in the route between the two destinations, in distance 75 kilometers.
- The connectivity works in Manzanillo, such as the railway bypass, and the construction of the tunnel will prevent the railroad from passing through the center of town. In Colima, there are work projects in highways, railroads and ports underway by the CFE (Federal Electricity Commission), Pemex and the SCT (Department of Communications and Transportation).

Capital Investment

	Millions of Pesos	% share
Colima	3,717	7.9
Distrito Federal	3,120	6.6
Michoacán de Ocampo	2,232	4.7
Veracruz	2,220	4.7
México	2,213	4.7
Oaxaca	2,186	4.6
Jalisco	2,120	4.5
Sinaloa	2,093	4.4
Sonora	2,063	4.4
Chihuahua	2,014	4.3
Guanajuato	1,938	4.1
Chiapas	1,920	4.1
Zacatecas	1,839	3.9
Guerrero	1,810	3.8
Durango	1,669	3.5
Nuevo León	1,664	3.5
Baja California	1,595	3.4
San Luis Potosí	1,571	3.3
Tamaulipas	1,529	3.2
Puebla	1,528	3.2
Tabasco	1,498	3.2
Hidalgo	1,462	3.1
Coahuila de Zaragoza	1,450	3.1
Yucatán	1,349	2.9
Querétaro Arteaga	1,261	2.7
Tlaxcala	1,238	2.6
Quintana Roo	1,207	2.6
Campeche	1,092	2.3
Baja California Sur	1,079	2.3
Morelos	979	2.1
Nayarit	815	1.7
Aguascalientes	630	1.3
Otros	1,124	2.4
Nacional	47,299	100.0
Total	62,065.4	100.0
Highways	50,352	81.1
Capital investment	47,299	
Ports	3,254	5.2
Airports	700	1.1
ASA network	100	
AICM	120	
Railroads	6,148	9.9
Capital investment	2,450	
STC Metro	3,000	
Communications	64	0.1
Others	1,547	2.5

Others: Considers investment in maintenance in the states. Also includes investment made in more than one state.

Source: Prepared with 2009 PEF (Federal Government Expenditures Budget) data

Main Physical Investment Projects in the 2009 PEF (Federal Government Expenditures Budget): Hydrocarbons

Capital Investment

	Millions of Pesos	% share
Exploitation, prod. and distribution	83,509	36.7
Campeche	73,083	32.1
Tabasco	39,391	17.3
Veracruz de Ignacio de la Llave	15,412	6.8
Tamaulipas	5,286	2.3
Guanajuato	3,551	1.6
Infrastructure rehabilitation	1,700	0.7
Nuevo León	1,580	0.7
Federal District	1,107	0.5
Hidalgo	657	0.3
Oaxaca	603	0.3
Jalisco	271	0.1
Querétaro Arteaga	249	0.1
Chiapas	155	0.1
Baja California Sur	112	0.0
Puebla	66	0.0
Corporate	64	0.0
Baja California	10	0.0
Quintana Roo	7	0.0
México	3	0.0
Others	677	0.3
National	227,491	100.0
Total	227,491	100.0
Corporate	64	0.0
Exploitation and production	197,722	86.9
Gas and petrochemicals	4,131	1.8
Petrochemicals	2,439	1.1
Refining	22,459	9.9

Others: Considers investment in maintenance in the states. Also includes investment made in more than one state.

Source: Prepared with 2009 PEF (Federal Government Expenditures Budget) data.

- The definition of the location (Tula, Hidalgo) and the cost of the new refinery (the first after 30 years), as well as the reconfiguration of the existing refineries (Minatitlan and Salamanca) could be the first signs that investment in Pemex is beginning to go forward.
- If this occurs, the volume of construction works represented by projects of reconversion, storage infrastructure, distribution and construction of pipelines would be more than four times the maximum done in the last 25 years, without including the new refinery.
- In petrochemicals, 77% of the investment will be concentrated in two plants in Veracruz (Cangrejera and Morelos), with the intention being to increase the production of inputs for the manufacture of plastics and depend less on imports.
- The results of the investment in exploitation and production will be very important. The 2007 goal of maintaining production at close to 3.0 million barrels daily seems ambitious, since this year, it is already at around 2.5 million barrels daily.
- The deep-sea drilling project for the Lakach well in the Coatzacoalcas zone will be developed when the equipment is available. According to Pemex, deep-sea oil production will start in 2015.

Main Physical Investment Projects in the 2009 PEF (Federal Government Expenditures Budget): Electricity

- The same as in highways, investment in electricity advances at a rapid pace.
- The La Yesca hydroelectric plant (Jalisco and Nayarit) will incorporate 750 megawatts in the National Electric System, equivalent to 1.5 times the annual consumption in Nayarit. The dam will be the highest of its type in the world: it will be concluded in 2011.
- The new terminal for storage and regasification of Liquefied Natural Gas in Manzanillo will guarantee supply at competitive prices of the mixed-cycle power plants I and II, Guadalajara I and II, Bajío, El Sauz and Salamanca and will spur modernization of the Manzanillo I and II thermoelectrical power plant, improving its operating efficiency up to 75%.
- CFE (the Federal Electricity Commission) will obtain better gas prices than those it obtains by buying from Pemex. Annual savings are estimated at US\$230 million. Another important benefit of the terminal is supply of the industrial zone in the region, which to date has suffered important limitations in the supply of gas.

Capital Investment

	Millions of Pesos	% share
Generation and transmission	14,343	36.3
Real estate and moveable assets	8,501	21.5
Nuevo León	3,342	8.5
Guerrero	2,749	7.0
México	2,622	6.6
Federal District	2,288	5.8
Hidalgo	978	2.5
Baja California	693	1.8
Veracruz	607	1.5
Chihuahua	549	1.4
Chiapas	409	1.0
Nayarit	372	0.9
Sonora	297	0.8
Baja California Sur	296	0.7
Michoacán	269	0.7
Guanajuato	249	0.6
Tamaulipas	210	0.5
Jalisco	162	0.4
Querétaro de Arteaga	117	0.3
Oaxaca	108	0.3
Quintana Roo	84	0.2
Colima	69	0.2
Sinaloa	69	0.2
Puebla	45	0.1
Morelos	43	0.1
Durango	33	0.1
Coahuila	27	0.1
National	39,531	100.0
Total	40,452	100.0
Physical investment	39,531	97.7
Others	921	2.3

Others: Considers investment in maintenance in the states. Also includes investment made in more than one state.

Source: Prepared with 2009 PEF (Federal Government Expenditures Budget) data

Main Physical Investment Projects in the 2009 PEF (Federal Government Expenditures Budget): Health

Capital Investment

	Millions of Pesos	% share
Morelos	261	4.2
Tabasco	252	4.1
Yucatán	251	4.1
Hidalgo	250	4.1
San Luis Potosí	247	4.0
Chiapas	246	4.0
México	237	3.8
Quintana Roo	230	3.7
Campeche	219	3.6
Durango	219	3.5
Baja California Sur	214	3.5
Zacatecas	214	3.5
Chihuahua	210	3.4
Baja California	206	3.3
Oaxaca	201	3.3
Jalisco	199	3.2
Guerrero	194	3.1
Coahuila de Zaragoza	191	3.1
Tamaulipas	181	2.9
Sinaloa	179	2.9
Colima	174	2.8
Puebla	174	2.8
Veracruz de Ignacio de la Llave	170	2.8
Distrito Federal	164	2.7
Querétaro Arteaga	160	2.6
Guanajuato	157	2.5
Nuevo León	156	2.5
Aguascalientes	140	2.3
Michoacán de Ocampo	135	2.2
Nayarit	122	2.0
Sonora	114	1.8
Tlaxcala	101	1.6
Nacional	6,168	100.0
Total	10,650	100.0
Physical investment	6,168	57.9
Health service support	2,482	23.3
ISSSTE High-Specialty Gen.Hospital, Morelia	250	2.3
ISSSTE General Hospital, Saltillo	250	2.3
Opportunities	1,500	14.1

Others: Considers investment in maintenance in the states. Also includes investment made in more than one state.

Source: Prepared with 2009 PEF (Federal Government Expenditures Budget) data

- The investment in physical infrastructure in Health is directed toward the modernization and creation of new high-specialty hospitals both for the IMSS- and the ISSSTE-affiliated population as well as for those who do not have access to this service.
- Particularly outstanding are the substitutions and works of the High Specialty Hospitals in the states of Baja California Sur, Durango, Colima and Aguascalientes.

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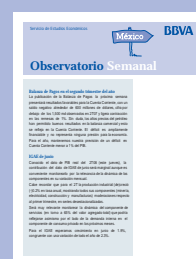
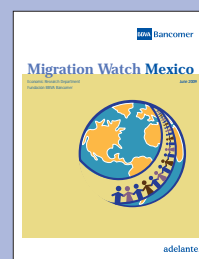
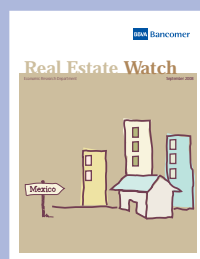
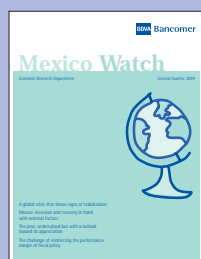
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