Peru
Recent Economic Development in Infrastructure (REDI) (vol. 2)
Investing in Infrastructure as an Engine for Growth: Spending More, Faster, and Spending Better
December 1, 2010

Sustainable Development Department
Latin America and Caribbean Region
# ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANEPSSA</td>
<td>Asociación de Empresas Prestadoras de Servicio de Saneamiento del Perú (Peru Association of Enterprises Providers of Sanitation Services)</td>
<td>MVCS Ministerio de Vivienda, Construcción y Saneamiento (Ministry of Housing, Construction and Sanitation)</td>
</tr>
<tr>
<td>BUMs</td>
<td>Barrios Urbanos Marginales (Marginalized Urban Areas)</td>
<td>PCM Presidencia de la Corte Suprema de Justicia (Presidency of the Council of Ministers)</td>
</tr>
<tr>
<td>CEPRI</td>
<td>Comisión Especial de Privatización (Special Privatization Commission)</td>
<td>SNIP Sistema Nacional de Inversión Pública (National Public Investment System)</td>
</tr>
<tr>
<td>CONAM</td>
<td>Consejo Nacional del Ambiente (National Environment Council)</td>
<td>SUNASS Superintendencia Nacional de Servicios de Saneamiento (National Agency of Sanitation Services)</td>
</tr>
<tr>
<td>DGPMSP</td>
<td>Dirección General de Programación Multianual del Sector Público (General Directorate of Multi-annual Planning for the Public Sector)</td>
<td>TRASS Tribunal Administrativo de Solución Reclamos de Usuarios de Servicios de Saneamiento (Administrative Court for Claims from Users of Water and Sanitation Services)</td>
</tr>
<tr>
<td>DGPP</td>
<td>Dirección General de Presupuesto Público (General Directorate for Public Budget)</td>
<td>VMCS Vice Ministerio de Construcción y Saneamiento (Vice Ministry of Construction and Sanitation)</td>
</tr>
<tr>
<td>DIGESA</td>
<td>Dirección General de Salud Ambiental (General Directorate for Environmental Health)</td>
<td>vpd vehicles per day</td>
</tr>
<tr>
<td>DSR</td>
<td>Dirección de Saneamiento Rural (Rural Sanitation Directorate)</td>
<td></td>
</tr>
<tr>
<td>DSU</td>
<td>Dirección de Saneamiento Urbano (Urban Sanitation Directorate)</td>
<td></td>
</tr>
<tr>
<td>ECLAC</td>
<td>Economic Commission for Latin America and the Caribbean</td>
<td></td>
</tr>
<tr>
<td>EPS</td>
<td>Empresas Prestadoras de Servicios de Saneamiento (Providers of Water and Sanitation Services)</td>
<td></td>
</tr>
<tr>
<td>FONAFE</td>
<td>Fondo Nacional de Financiamiento de la Actividad Empresarial del Estado (National Fund for the Financing of State Entrepreneurial Activity)</td>
<td></td>
</tr>
<tr>
<td>FRA</td>
<td>United States Federal Railroad Administration</td>
<td></td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technologies</td>
<td></td>
</tr>
<tr>
<td>JASS</td>
<td>Juntas Administradoras de Servicios de Saneamiento (Sanitation Services’ Administration Committees)</td>
<td></td>
</tr>
<tr>
<td>LAC</td>
<td>Latin America and Caribbean</td>
<td></td>
</tr>
<tr>
<td>LPI</td>
<td>Logistics Performance Index</td>
<td></td>
</tr>
<tr>
<td>MEF</td>
<td>Ministry of Economy and Finance</td>
<td></td>
</tr>
<tr>
<td>MINSA</td>
<td>Ministerio de Salud (Health Ministry)</td>
<td></td>
</tr>
<tr>
<td>MTC</td>
<td>Ministry of Transport and Communications</td>
<td></td>
</tr>
</tbody>
</table>

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**Country Director:** Carlos Felipe Jaramillo  
**Sector Director:** Laura Tuck  
**Sector Manager:** Aurelio Menendez  
**Task Team Leader:** Nicolas Peltier-Thiberge
TABLE OF CONTENTS

Chapter 7: Sector perspectives: Transport ................................................................. 6
Chapter 8: Sector perspectives: Water and Sanitation .............................................. 49
Chapter 9: Sector perspectives: Electricity ............................................................... 98
Chapter 10: Summary of policy recommendations .................................................... 141

LIST OF FIGURES

Figure 7-1: Quality of South American ports (2003) .................................................. 7
Figure 7-2: Port activity in Latin America (2003-2006) ............................................... 8
Figure 7-3: Logistics costs (Percent Product Value), 2004 ........................................... 11
Figure 7-4: Number of deaths caused by car accidents per 100,000 people .................. 16
Figure 7-5: Evolution of transport investments .......................................................... 33
Figure 7-6: Transport expenditures in Peru and other LAC countries ......................... 34
Figure 7-7: Evolution of national road expenditures ................................................... 36
Figure 8-1: Water and sanitation coverage (broad definition) ..................................... 49
Figure 8-2: Annual investment per capita in water supply and sanitation .................... 50
Figure 8-3: Water coverage evolution in areas under EPS management ....................... 56
Figure 8-4: Sewerage coverage evolution in areas under EPS management .................. 56
Figure 8-5: Access to water services (public connection) ........................................... 57
Figure 8-6: Access to sanitation services (public connection) ..................................... 58
Figure 8-7: Water sources for poor and non-poor (2006) ............................................ 58
Figure 8-8: Access to drinking water in peri-urban areas ......................................... 59
Figure 8-9: Access to sewerage in peri-urban areas .................................................. 60
Figure 8-10: Continuity of water services provided by EPSs by size (2007) .................... 61
Figure 8-11: Evolution of water and sanitation investments ........................................ 72
Figure 8-12: Percentage of investments in Water for All Program ............................... 73
Figure 8-13: Glacier in the Peruvian Andes ............................................................... 83
Figure 8-14: Water and urban sanitation coverage in Peru and LAC ............................ 85
Figure 9-1: Overall investments in the electricity sector 1995-2007 (in millions of US$) .................................................................................................................. 99
Figure 9-2: Correlation of electrification coverage and rural population ..................... 100
Figure 9-3: Structure of the 2007 total tariff to regulated final users ............................ 103
Figure 9-4: Curve of generation energy price vs. power demand for dry season ............. 105
Figure 9-5: Evolution of distribution losses 1995-2007 ............................................. 108
Figure 9-6: Frequency of power cuts in Lima and the rest of Peru .............................. 109
Figure 9-7: Average duration of power cuts in Lima and the rest of Peru ...................... 109
Figure 9-8: Electricity market framework ................................................................. 110
Figure 9-9: Overall energy generation in 2007 (GWh) ................................................ 111
Figure 9-10: Consumption by “free” market users in 2007 ......................................... 112
Figure 9-11: Number of users in the regulated market in 2007 .................................... 114
Figure 9-12: Regulated market energy sales by distribution companies in 2007 ............. 114
Figure 9-13: Public approval of privatization policy .................................................. 116
Figure 9-14: Electricity sector institutional framework ............................................... 120
Figure 9-15: Regional electrification coverage ......................................................... 125
Figure 9-16: Correlation of electrification coverage and rural population ........................................ 125
Figure 9-17: Overall investments in the electricity sector 1995-2007 (in millions of US$) ............ 129
Figure 9-18: Private sector investments in the electricity sector 1995-2007 (in millions of US$) .... 130

LIST OF TABLES

Table 7-1: Peruvian road network (2008) .................................................................................. 6
Table 7-2: Logistics performance indicators of South American countries ............................... 10
Table 7-3: Port fees in Peru and other LAC countries .................................................................... 11
Table 7-4: Airport fees in Peru and other LAC countries ............................................................... 12
Table 7-5: Estimated annual over-costs of the Callao port .......................................................... 13
Table 7-6: Peruvian road concessions .......................................................................................... 18
Table 7-7: Transport investments flagged as priorities in Peru’s stimulus package ....................... 22
Table 7-8: Budgeted resources in MTC’s strategic and institutional plan for 2007-2011 ............. 35
Table 8-1: Water service providers in Peru (2004) .................................................................. 54
Table 8-2: Peru’s rural population (2004) ................................................................................. 55
Table 8-3: Water and sanitation services coverage .................................................................... 55
Table 8-4: Access to water and sanitation in rural areas (2000) .................................................... 56
Table 8-5: Situation of peri-urban areas, national level ............................................................... 59
Table 8-6: Environmental risk factors in peri-urban settlements ............................................... 60
Table 8-7: Municipalities according to hours of water service per day (2005) ............................ 61
Table 8-8: Simplified income statements, 2007 ........................................................................ 63
Table 8-9: Water utilities debt/revenue ratios, 2007 ................................................................. 63
Table 8-10: Condition of rural water infrastructure (%) (2002 - 2003) ....................................... 64
Table 8-11: Summary of responsibilities in the sanitation subsector ......................................... 69
Table 8-12: Coverage targets set by national planning instruments ............................................ 70
Table 8-13: Sources of investment financing ............................................................................. 72
Table 8-14: Average tariffs in water utilities in Peru (1994-2007) ............................................. 76
Table 8-15: Investment activity in urban water utilities service areas (millions of US$) ............. 77
Table 8-16: Urban water sector investment needs 2006-2015 (millions US$) ......................... 78
Table 8-17: Financing structure of the Tumbes concession ...................................................... 81
Table 8-18: Management indicators for the concession ............................................................. 81
Table 9-1: Evolution of average electricity prices 1995-2007 ..................................................... 104
Table 9-2: Annual average marginal energy system costs 1998-2007 .................................... 106
Table 9-3: Marginal price and tariff (Jan-Jun 2008) ................................................................. 106
Table 9-4: Composition of users in the “free” market in 2007 .................................................... 112
Table 9-5: Distribution company characteristics ....................................................................... 113
Table 9-6: Main private local companies and parent corporations in electricity ......................... 117
Table 9-7: Participation of the most important companies (private and public) in each of the three business electricity segments ....................................................................................... 117
Table 9-8: Camisea NG price for power generation (US$/MMBTU) ........................................... 122
Table 9-9: Natural gas prices (site of generation) ................................................................. 123

LIST OF BOXES

- 4 -
CHAPTER 7 : SECTOR PERSPECTIVES: TRANSPORT

OVERVIEW

Improving access and integration: a pending challenge for the road sector

The Peruvian road network consists of 78,397 kilometers of registered roads. Before a recent reclassification which expanded the national network to about 23,000 km, the registered network included 16,857 km (22 percent) of national roads, 14,251 km (18 percent) of departmental roads, and 47,289 km (60 percent) of rural roads. The primary network (national roads) itself used to consist of 10,643 km of paved roads, as well as 5,160 km of gravel roads, and 1,106 km of earth roads (almost the entirety of which are in poor condition). The secondary network (departmental roads) consisted of 1,140 km of paved roads (8 percent), 5,985 km of gravel roads (42 percent), and 7,126 km of dirt roads (50 percent).

Table 7-1: Peruvian road network (2008)

<table>
<thead>
<tr>
<th>Network</th>
<th>Length (km)</th>
<th>%</th>
<th>Surface (km)</th>
<th>Condition (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>paved</td>
<td>unpaved</td>
</tr>
<tr>
<td>Primary (red nacional)</td>
<td>16,857</td>
<td>22</td>
<td>10,643*</td>
<td>6,214</td>
</tr>
<tr>
<td>Secondary (red departamental)</td>
<td>14,251</td>
<td>18</td>
<td>1,140</td>
<td>13,111</td>
</tr>
<tr>
<td>Tertiary (red rural)</td>
<td>47,289</td>
<td>60</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Registered Network</td>
<td>78,397</td>
<td>100</td>
<td>11,783</td>
<td>66,614</td>
</tr>
<tr>
<td>Non-Motorized Transport paths (caminos de herradura) [non-registered]</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* including 2,112 km that were improved in 2008.

Source: Ministry of Transport and Communications (MTC).

Lower density of roads, especially paved. While unpaved roads can be a cost-effective way to provide access while ensuring good levels of transitability, paved roads are needed for major transport corridors, and are generally justified when traffic exceeds 300 vehicles per day. Peru is lagging behind neighboring countries with regard to the proportion and density of its paved road network. Only 12 percent of the Peruvian road network is paved, well behind Chile (29 percent), Argentina (30 percent), Venezuela (32 percent), and Uruguay (35 percent). When compared to its population, paved road density in Peru (317 km per million people) is the lowest in South America, with the exception of Colombia (309 km). In comparison, Argentina has 1,713 km of paved roads per million people; Chile has 934 km, while Ecuador has 377 km, and Bolivia, 322 km.

Large parts of the road network still need to be improved. At the beginning of the 1990s, Peru’s national road network was close to collapsing, with only 12 percent in good condition. Between 1991 and 1995, an emergency program involving an average annual investment of US$416 million was implemented. This program helped multiply the length of roads in good condition by 3.8, and decreased the roads in poor condition by 72 percent between 1990 and 1999. However, large parts of the network still remain in less-than-good condition: only 34 percent of paved national roads are in good condition 51 percent are in fair condition, and 15 percent are in poor condition. For the unpaved national road network, only 3 percent are in good condition, while 34 percent are considered fair, and 63 percent still remain in poor condition.

Inequitable access to transport. Road density and road conditions are lower in rural areas. Many remote villages in rural Peru are not accessible by motorized vehicles: non-motorized transport tracks, generally
dangerous because of their poor condition, constitute the only means of access. In 2000, it was estimated that only 28 percent of rural dwellers had access to a road in good condition. The situation has improved as a result of the successful rural roads program initiated by Peru in 1995, but the extent of this program is still largely insufficient to address the needs: between 2006 and 2012, the Government of Peru (GoP) only aims at rehabilitating an additional 6 percent of the registered rural roads network, while about 70 percent of that network still remains in poor or very poor condition.

Peruvian ports are lagging behind

Peru has eleven public port terminals, seven of which are on the Pacific Coast, with the other four on the Amazonas, Huallaga, Ucayali, and Madre de Dios rivers in the Selva macro-regions. In addition, several private ports are used for petroleum and mining products.

The Port of Callao is the largest port in Peru, the seventh largest in South America (the eighth largest for containers) and ranks among the 100 largest ports in the world. In 2007, Callao processed 41 million TEUs¹ and in 2008 an increase of 15 percent is expected. The load management system of the Callao port was improved in 2008 with the installation of an electronic system that enabled a reduction by 70 percent in the time required for imported goods to be controlled. The reform was part of the “Unified Window for External Trade” program (VUCE in Spanish), whose objective is to simplify administrative processes for trade. Despite this progress, port services in Callao are currently characterized by high inefficiencies and low productivity, resulting in costs that are higher than benchmarks in the region.

Constrained port capacity. Before the global economic downturn, which severely affected maritime transport, the limited capacity of Peruvian ports was being challenged by the economic and trade growth experienced by Peru over the past five years. The use of docking facilities (amarraderos) in Callao reached on average 90 percent of the merchandise that entered the port, while the international standard was only 60 percent. The ongoing construction of the new Muelle Sur terminal is expected to help absorb the growing demand for port services until 2016. Although growth has slowed due to the global economic downturn, demand for port services is still increasing at an average rate of over 10 percent a year, so the new terminal could also become saturated by as soon as 2012. The global crisis may postpone this scenario by a few years. However, it is important for Peru to prepare itself for when the expansion of global trade resumes.

The low performance of Peruvian ports. According to firm surveys conducted by the World Economic Forum (WEF) in 2006, the perception that private enterprises have of the quality of Peruvian port infrastructure is lower than for neighboring countries (in particular Colombia and Ecuador). It is also less than the Latin America average and than for countries with a similar level of development (such as Tunisia and Thailand). These perceptions were confirmed by a 2003 study of seven South American ports conducted by Valencia Polytechnic University. According to this study, the port of Callao ranked last for speed, reliability and security, and fourth for cost. While this performance may have improved as a consequence of recent reforms, progress to date likely has been insufficient to reach Peru’s objective of making of Callao one of the major logistics hubs on the Pacific Coast.

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¹ TEU is Twenty-foot Equivalent Unit, the measure used for capacity in container transportation
Are shortfalls in the port sector affecting port activity? In 2006, Peru ranked ninth in Latin America for port activity, with 19 million metric tons handled. Between 2003 and 2006, port activity in Peru only increased by 3.2 percent, while the Gross Domestic Product (GDP) increased by 34 percent and international trade by 52 percent. Unlike in other countries in the region, maritime transport might be less preferred in Peru than other transport modes because of constraints (capacity, quality, costs) in the port sector.

Source: Universidad Politecnica de Valencia, IIRSA-CAF, 2003
Other transport infrastructure

**Railways.** Historically, railways have been an important factor for Peru's territorial integration and economic development. Between 1850 and 1964, 42 railway lines were built, totaling 4,257 km. Over the past 50 years though, this transport mode has declined due to the growing competition from roads and air transport. As of today, the only railroads used for public transportation link Arequipa, Puno, Cusco, and Machu Picchu on the one hand and Lima with Huancayo on the other. In addition, a private line is operated by the enterprise Southern to transport minerals to the port.

**Airports.** Peru has 145 air terminals, including 11 international airports, 20 national airports, 104 regional airports, and 10 heliports. In contrast with other transport modes, the availability of air transport infrastructure is among the highest in South America: Peru has 0.7 airports with a runway longer than 2.4 km per million people, far more than Chile (0.4), Ecuador (0.3), Colombia (0.2), or Brazil (0.1).

**River-based transport** is particularly important in the *Selva* macro-region. The Amazonian river network includes more than 14,000 km of rivers, of which 6,000 km are considered navigable. The main rivers are Amazonas, Marañon, Huallaga, Ucayali, Napo and Putumayo. The main river-based transport lines are Iquitos-Pucallpa, Iquitos-Yurimaguas. Iquitos is the most important river port. Navigation is more complicated and more costly during the months from July through September. Sixty percent of the Peruvian river-based transport sector consists of small “single-owner” enterprises who own a single boat, the rest being larger operators. River ports are either floating infrastructure (Iquitos, Yurimaguas) or fixed (Puerto Maldonado). Goods transported on Peruvian rivers include: wood, cement, beer, equipment, food products, lubricants, explosives, steel and iron, vehicles, minerals, gasoline, textiles, etc.

**Obsolete vehicle fleet and excessive informality of transport services**

*The market structure for freight transport services is highly fragmented.* Due to high levels of labor informality, the exact market structure is little known. As of 2006, 35,741 enterprises were registered in the National Freight Transport Registry. The average number of vehicles per operator was 2.35, compared to 1.99 in 2004. Many transport operators in fact own only one vehicle. High levels of informality are observed, in part to escape regulatory constraints and taxes. This informality contributes to the high fragmentation of the sector and, in some cases, to dangerous transport conditions due to obsolete vehicles.

*The situation is better for passenger transport; however, the aging vehicle fleet remains a problem.* In 2007, the registered fleet for passenger transport included 4,372 vehicles, 290 more than the previous year. Operating enterprises own an average of 12 vehicles; this figure has been increasing in recent years, illustrating a concentration phenomenon and a progressive strengthening of operators. The segment of firms owning 31-50 vehicles has been growing the most. These firms are of sufficient sizes in order to only operate in transport terminals instead of informally “looking for passengers” on the way. More stringent regulation of vehicles, like the interdiction of “bus-trucks” and of imported vehicles with modified structures, as well as the implementation of the “*Tolerancia Cero*” (Zero Tolerance) plan have produced a reduction in the numbers of serious traffic accidents (from an average of 10.13 persons affected per accident in 2005 to 6.98 persons in 2007). Another factor contributing to greater safety conditions is the growing proportion of firms operating passenger transport services that are buying new vehicles (from only 28 firms in 2001 to 84 in 2007). Nevertheless, the absence of limitations for the age of vehicles in Peru, unlike in Mexico, Argentina, Chile, or Colombia, explains why the Peruvian fleet remains older. Some vehicles have been in use for 30 years, much over the limits authorized in other countries in the Latin America and Caribbean (LAC) region.
QUALITY, PRICING, AND EFFICIENCY

The performance of logistics could be improved

The performance of the logistics chain is critical to whether countries can trade on time and at a low cost. Logistics encompasses various dimensions from customs and trade-related infrastructure to inland transit, logistics services, information systems, and port efficiency.

Lower costs and a better timeliness of shipments could improve the performance of international logistics. According to the 2007 World Bank’s Logistics Performance Index (LPI), Peru ranks 59th in the world and third in South America (after Chile and Argentina) for the performance of international logistics. This relatively good ranking is particularly due to the performance of Peruvian customs (second in South America after Chile). However, it still could be improved with lower domestic logistics costs (fourth in the region) and a better timeliness of shipments in reaching their destinations (eighth in South America).

Table 7-2: Logistics performance indicators of South American countries

<table>
<thead>
<tr>
<th>Country</th>
<th>LPI</th>
<th>Customs</th>
<th>Infrastructure</th>
<th>International shipments</th>
<th>Logistics competence</th>
<th>Tracking &amp; tracing</th>
<th>Timeliness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>3.20</td>
<td>2.37</td>
<td>3.10</td>
<td>2.91</td>
<td>3.30</td>
<td>3.42</td>
<td>4.14</td>
</tr>
<tr>
<td>Argentina</td>
<td>3.10</td>
<td>2.63</td>
<td>2.75</td>
<td>3.15</td>
<td>3.03</td>
<td>3.15</td>
<td>3.82</td>
</tr>
<tr>
<td>Chile</td>
<td>3.09</td>
<td>2.93</td>
<td>2.86</td>
<td>2.74</td>
<td>2.94</td>
<td>3.34</td>
<td>3.80</td>
</tr>
<tr>
<td>Mexico</td>
<td>3.05</td>
<td>2.55</td>
<td>2.95</td>
<td>2.83</td>
<td>3.04</td>
<td>3.28</td>
<td>3.66</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>2.91</td>
<td>2.61</td>
<td>2.56</td>
<td>2.64</td>
<td>2.80</td>
<td>3.13</td>
<td>3.71</td>
</tr>
<tr>
<td><strong>Peru</strong></td>
<td><strong>2.80</strong></td>
<td><strong>2.50</strong></td>
<td><strong>2.66</strong></td>
<td><strong>2.75</strong></td>
<td><strong>2.61</strong></td>
<td><strong>2.89</strong></td>
<td><strong>3.38</strong></td>
</tr>
<tr>
<td>Colombia</td>
<td>2.77</td>
<td>2.50</td>
<td>2.59</td>
<td>2.54</td>
<td>2.75</td>
<td>2.75</td>
<td>3.52</td>
</tr>
<tr>
<td>Ecuador</td>
<td>2.77</td>
<td>2.32</td>
<td>2.38</td>
<td>2.86</td>
<td>2.60</td>
<td>2.84</td>
<td>3.55</td>
</tr>
<tr>
<td>Paraguay</td>
<td>2.75</td>
<td>2.37</td>
<td>2.44</td>
<td>2.87</td>
<td>2.59</td>
<td>2.72</td>
<td>3.46</td>
</tr>
<tr>
<td>Uruguay</td>
<td>2.75</td>
<td>2.71</td>
<td>2.58</td>
<td>2.77</td>
<td>2.59</td>
<td>2.78</td>
<td>3.06</td>
</tr>
<tr>
<td>Venezuela</td>
<td>2.68</td>
<td>2.06</td>
<td>2.44</td>
<td>3.05</td>
<td>2.53</td>
<td>2.84</td>
<td>3.05</td>
</tr>
<tr>
<td>Bolivia</td>
<td>2.51</td>
<td>2.26</td>
<td>2.24</td>
<td>2.53</td>
<td>2.38</td>
<td>2.38</td>
<td>3.20</td>
</tr>
<tr>
<td>Latin America &amp; Caribbean</td>
<td>2.74</td>
<td>2.38</td>
<td>2.46</td>
<td>2.70</td>
<td>2.62</td>
<td>2.84</td>
<td>3.41</td>
</tr>
</tbody>
</table>


High logistics costs. Although there is no precise definition of logistics costs, they can generally be defined as direct transaction costs (transport but also trade-related costs like the processing of permits, customs or standards) added to indirect financial costs (e.g., inventory, storage, security) and non-financial costs (insurance). With about 32 percent of product value, Peru’s logistics costs are among the highest in Latin America, well above Colombia’s (23 percent) and Chile’s (18 percent), but also those of Brazil (26 percent) and Argentina (27 percent). In comparison, the OECD\(^2\) average for logistics costs is about 9 percent (Guasch and Kogan, 2005).

High logistics costs in Peru are caused by different factors. For example, the average cost for importing a 40-foot container or a semi-trailer in Peru amounts to US$707, far more than in Chile (US$274), Venezuela (US$490), or Argentina (US$634). Insufficient quality transport infrastructures are also generating high transport costs. Eighty percent of firms surveyed by the World Bank LPI initiative reported they believed the quality of transport infrastructure in Peru was low or very low, a proportion

\(^2\) Organization for Economic Cooperation and Development
that – within South America – is higher only in Bolivia and Colombia. Because of poor transport infrastructure, Peruvian firms need to have high inventories, to account for contingencies. This situation is particularly striking for inventories of raw materials for which the mean ratio to the U.S. level by industry reaches 4.19, compared to 2.98 in Brazil, 2.22 in Colombia, 2.17 in Chile, and 1.58 in Mexico. High inventories generate financial costs which in turn increase unit costs, lowering competitiveness and productivity.

**Figure 7-3: Logistics costs (Percent Product Value), 2004**

![Graph showing logistics costs for different countries](image)

*Source: Guasch and Kogan, 2005*

**Transport costs are generally high, with the exception of road toll fees**

*Port fees are high compared to regional competitors.* Current port fees charged by the Callao terminal are in general higher than its main competitors in the Pacific coast of South America (Buenaventura in Colombia, Guayaquil in Ecuador, and Valparaiso and San Antonio in Chile). High fees are mostly caused by efficiency losses caused by the conditions of port infrastructure and by high operation costs. To address the issue, OSITRAN\(^3\) has approved a revision of applicable fees. However, this application of this revision has been suspended by ENAPU\(^4\). Port fees charged by other Peruvian ports (Paita, Salaverry, Chimbote, San Martín, Ilo, and Matarani) are also generally higher than other ports in the region with a similar size and function (Arica and Iquique in Chile, and Bolivar and Esmeraldas in Ecuador).

**Table 7-3: Port fees in Peru and other LAC countries**

<table>
<thead>
<tr>
<th>US$</th>
<th>Boat Docking (operat)</th>
<th>Wharf use (per m&amp;hr)</th>
<th>Fractioned</th>
<th>Rolling</th>
<th>Solid</th>
<th>Liquid</th>
<th>Container 20 feet</th>
<th>Container 40 feet</th>
<th>Passenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Callao -current</td>
<td>200</td>
<td>0.65</td>
<td>10</td>
<td>28</td>
<td>3</td>
<td>1</td>
<td>80</td>
<td>120</td>
<td>8</td>
</tr>
<tr>
<td>Callao -suspended</td>
<td>200</td>
<td>0.40</td>
<td>5</td>
<td>15</td>
<td>2</td>
<td>0.8</td>
<td>60</td>
<td>90</td>
<td>8</td>
</tr>
<tr>
<td>Buenaventura</td>
<td>0.44</td>
<td>5.5</td>
<td>25</td>
<td>5.5</td>
<td>5</td>
<td></td>
<td>86</td>
<td>106</td>
<td>8</td>
</tr>
</tbody>
</table>

\(^3\) Peruvian regulator for public transport infrastructure  
\(^4\) Spanish acronym for Empresa Nacional de Puertos S.A. (National Port Company)
Airport fees are aligned or higher than comparators. Most of the fees charged by the concessionaire of the Lima airport have been defined in the concession contract. Two of the fees are scheduled to be revised in 2008 by OSITRAN to account for productivity gains. Lima airport fees tend to be aligned with other airports in the region, although they are sometimes higher particularly for international activities. Regarding the regional Peruvian airports administered by CORPAC, fees were revised in 2004 by OSITRAN with a view to better reflect the actual operating costs and make cross-subsidies between airports more transparent.

### Table 7-4: Airport fees in Peru and other LAC countries

<table>
<thead>
<tr>
<th></th>
<th>Peru</th>
<th>Chile</th>
<th>Colombia</th>
<th>Ecuador</th>
<th>Argentina</th>
<th>Bolivia</th>
<th>Brazil</th>
<th>US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take off / landing</td>
<td>221</td>
<td>128</td>
<td>214</td>
<td>87</td>
<td>29</td>
<td>97</td>
<td>436</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>3</td>
<td>8</td>
<td>0</td>
<td>26</td>
<td>9</td>
<td>29</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Parking</td>
<td>22</td>
<td>3</td>
<td>21</td>
<td>13</td>
<td>4</td>
<td>29</td>
<td>87</td>
<td></td>
</tr>
<tr>
<td>Per passenger</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>9</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Loading</td>
<td>106</td>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navaid charge</td>
<td>101</td>
<td>78</td>
<td>70</td>
<td>22</td>
<td>3</td>
<td>0</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>Navigation</td>
<td>238</td>
<td>57</td>
<td>209</td>
<td>252</td>
<td>367</td>
<td>33</td>
<td>283</td>
<td></td>
</tr>
<tr>
<td>International</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take off / landing</td>
<td>1,305</td>
<td>733</td>
<td>1,177</td>
<td>1,157</td>
<td>1,280</td>
<td>1,015</td>
<td>1,007</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td>196</td>
<td>147</td>
<td>0</td>
<td>326</td>
<td>384</td>
<td>304</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Parking</td>
<td>130</td>
<td>21</td>
<td>118</td>
<td>164</td>
<td>1,068</td>
<td>304</td>
<td>201</td>
<td></td>
</tr>
<tr>
<td>Per passenger</td>
<td>30</td>
<td>26</td>
<td>30</td>
<td>5</td>
<td>18</td>
<td>25</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Loading</td>
<td>106</td>
<td>22</td>
<td>66</td>
<td></td>
<td>50</td>
<td>60</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td>Navaid charge</td>
<td>254</td>
<td>78</td>
<td>755</td>
<td>381</td>
<td>10</td>
<td>0</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td>Navigation</td>
<td>281</td>
<td>62</td>
<td>209</td>
<td>342</td>
<td>367</td>
<td>67</td>
<td>283</td>
<td></td>
</tr>
</tbody>
</table>

Source: IATA.\(^6\)

Toll roads. Average toll fees are lower in Peru than in other South America countries. The Ancón – Huacho – Pativilca road, operated by Norvial S.A. has a toll fee per kilometer of US$0.012 (1.2 cents). In comparison, toll fees in Mexico range from US$0.074 to 0.136 per km (with an average of 0.099); in Brazil from US$0.015 to 0.124 per km (with an average of US$0.043); and in Argentina from US$0.007 to 0.093 per km (with an average of US$0.018).

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\(^5\) Spanish acronym for Corporación Peruana de Aeropuertos y Aviación Comercial (Peruvian Corporation of Airports and Commercial Aviation)

\(^6\) Acronym for International Air Transport Association
Over-costs and inefficiencies in the port sector

The port sector is a particularly weak link in Peru’s logistics system. A saturated capacity, combined with expensive fees for port services, result in strong limitations for Peru’s overall competitiveness. Over-costs caused by the low performance of the port of Callao have been estimated up to US$218 million. These over-costs represent twice the revenues from port fees in Callao.

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated amount (US$m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity cost of time lost by commercial boats waiting for their turn to dock</td>
<td>27</td>
</tr>
<tr>
<td>Cost generated by a lower productivity in loading/unloading containers (15.6 containers per hour compared to a regional benchmark of 60)</td>
<td>18</td>
</tr>
<tr>
<td>Induced costs on firms’ inventories (8.7 days for freight to reach importing firms compared to a benchmark of 3)</td>
<td>147</td>
</tr>
<tr>
<td>Structural costs from the model “toolport” (US$152 unit cost for moving a container within the port, compared to a benchmark of US$120)</td>
<td>13</td>
</tr>
<tr>
<td>Over-costs generated by ENAPU7 (pensions, over-dimensioned workforce, cross-subsidies to lower-capacity ports)</td>
<td>13</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>218</strong></td>
</tr>
</tbody>
</table>

*Source: Tapia, J.*

The shortfalls of road maintenance

Road maintenance is the most critical activity in the road subsector to ensure a sound management of road assets. It is also the activity with the highest rates of return (typically higher than 50 percent), far before road rehabilitation or the construction of new infrastructure. However, the reduced visibility of road maintenance generally makes it less attractive to political decision makers. The situation of road maintenance in Peru is mixed: on the one hand, there are a number of success stories for efficient road asset management, both on the national and subnational networks. On the other hand, large proportions of the Peruvian road network still do not receive adequate levels of maintenance. Between 1992 and 2005, the IPE8 estimated that the lack of maintenance has caused the rapid deterioration of 1,357 km of national roads, generating a loss of US$718 million for the GoP.

A large proportion of the subnational road network still remains unattended. It is estimated that only 34 percent of the total road network receives some kind of maintenance and that only 12.5 percent can count on a permanent maintenance system. According to a 2007 study performed by IPE, the coverage of maintenance activities is not even sufficient to maintain recently rehabilitated roads: between 1997 and 2007, 52,301 km of roads were rehabilitated in Peru, of which only 31,916 km have received routine maintenance. The situation is particularly acute for regional and rural roads, of which only about a quarter receive permanent routine maintenance. In order to ensure access to rural Peru, the MTC, through Provías Descentralizado, has had in place since 1995 the highly successful Rural Roads Program, currently expanded through the Decentralized Rural Transport Project. These projects have been highly successful in scaling up the use of community-based microenterprises to routinely maintain unpaved roads. However, despite the success of this program, funding limitations have so far reduced its overall impact.

7 Empresa Nacional de Puertos (National Port Company)
8 Peruvian Economics Institute
Provías Nacional, within MTC,9 started experimenting, through the “Proyecto Perú” program, innovative contracts combining low-cost paving technologies together with five-year maintenance plans. These long-term performance-based contracts are applied to a package of 200 to 400 km of national roads. The contractor generally perform himself the larger scale works (initial upgrading, periodic maintenance), while routine maintenance is subcontracted to microenterprises. This maintenance modality is being rapidly scaled up by MTC: the total length of national roads maintained under the Proyecto Perú is expected to increase from 4,054 km to 12,700 km between 2009 and 2012. This modality should help secure long-term maintenance on a growing share of the national road network. While the Proyecto Perú program has so far been a success, legal constraints for mixed contracts have somehow limited the application of such arrangements. These constraints apply both to the applicable budget and procurement norms. Another modality envisaged by Provías Nacional to complement Proyecto Perú is the piloting of longer term (up to 10 years) rehabilitation and maintenance contracts (CREMA10 contracts). By combining rehabilitation and maintenance works, these contracts leave it up to the firms to find the right balance between initial improvement works and follow-up maintenance needs.

The successful microenterprise model is not expanding despite the growing maintenance needs. Another effective routine maintenance model is the use of microenterprises, mostly on the subnational road network but also to the national roads (Provías Nacional directly contracts routine maintenance activities to about 80 microenterprises). Over the past 15 years, the rural roads program implemented first by Provías Rural and then by Provías Descentralizado has promoted the creation of about 600 microenterprises for routine maintenance, constituted of men and women from poor rural communities along the roads. This model has proved highly successful to ensuring a sound road asset management, with some gravel roads seeing their life cycle extended by up to 15 years. Microenterprises have also generated a number of important social benefits, with about 6,000 employment opportunities being generated in rural areas and the promotion of rural entrepreneurship and gender equity.

Microenterprises were initially directly contracted but are now contracted on a competitive basis. The transition from direct to competitive contracting does not seem to have caused major disruptions in the system, probably because the long initial phase of direct contracting has allowed microenterprises to reach a sufficient level of entrepreneurial capacity. Routine maintenance works are financed in part by municipalities and in part through a specific intergovernmental transfer from MEF11 to municipalities. This transfer was made permanent in 200612 and has proved a strong incentive to maintain the microenterprise system. However, it only applies to the 14,750 km of rural roads rehabilitated by the program up to November 2006. In the absence of further incentives and technical support from the central government (following the completion of the decentralization in this area), there is some indication that the microenterprises created by Provías Descentralizado have reached some degree of sustainability. However, no extension of the model has been noted since 2006 (the number of microenterprises remain stable around 600), although additional roads needing maintenance have been rehabilitated.

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9 Ministry of Transport and Communications
10 Contratos de Rehabilitación y Mantenimiento (Contracts of Rehabilitation and Maintenance)
11 Ministry of Economy and Finance
12 Through Supreme Decree No. 017-2006-MTC
The high toll of road safety

With an annual 3,500 deaths and 47,000 people injured in 75,000 car accidents, Peru ranks very low in regard to road safety. The annual number of deaths caused by car accidents reaches 16 per 100,000 people, higher than Ecuador (15), Argentina (12), and Chile (10). When accounting for Peru’s lower motorization ratio and comparing to the number of vehicles, Peru has 25 deaths per 10,000 vehicles, compared to 24 for Bolivia, 15 for Ecuador, 12 for Colombia, 9 for Argentina, and 6 for Chile. Public transportation vehicles have a particular responsibility in deadly car accidents since they are involved in 4 out of 10 fatal accidents. The age of the public transportation fleet contributes to Peru’s poor road safety.
performance: 78 percent of public transportation vehicles involved in deadly accidents are more than 10 years old (CIDATT\(^{13}\)).

**Figure 7-4: Number of deaths caused by car accidents per 100,000 people**

![Figure 7-4: Number of deaths caused by car accidents per 100,000 people](image)


**Causes and consequences.** Driver behavior accounts for over 50 percent of road crashes; these accidents are attributed to speeding, recklessness, and inebriety. Studies also indicate that a lack of effective regulation of the vehicle fleet, particularly the public transport vehicles, is a major contributing factor in road crashes. Finally, deteriorated or poorly designed transport infrastructures also contribute to Peru’s road safety conditions. According to a recent road safety assessment performed by iRAP (International Road Assessment Programme) on about 3,000 km of Peruvian roads, about 22 percent of these roads can be considered highly dangerous for car users and 63 percent to pedestrians. A rough estimate of the economic cost of road crashes is about 1.5 percent of the GDP.

**Current road safety initiatives.** While road safety has been identified as a problem for many years, the Ministry of Transport and Communications has only recently given this issue high priority. The National Road Safety Council (Consejo Nacional de Seguridad Vial, or CNSV) has been reactivated and a comprehensive National Road Safety Plan has been prepared and endorsed. However, major obstacles still remain for the implementation of that plan. Some initiatives have been launched by the Government of Peru, like the “Tolerancia Cero” program to better enforce vehicle regulations, but results so far have been mixed.\(^{14}\)

The 2007-2011 National Safety Plan has a target to reduce road crashes by 30 percent through the

\(^{13}\) Spanish acronym for Centro de Investigación y de Asesoría del Transporte Terrestre (Research and consultancy center for land transport)

\(^{14}\) The “Tolerancia Cero” (zero tolerance) plan was launched by MTC in November 2006 with the aim to prevent crashes by tightening the control of public transport vehicles (vehicle conditions, technical inspections) and of drivers (drivers’ licenses). The plan was primarily enforced in Lima, having some impact on the conditions of vehicles in the capital city. However, no significant decrease of road crashes was observed, because several transport companies simply moved their obsolete vehicles to other parts of the country and also because the plan did not address other major causes of crashes (drivers’ behavior, in particular).
implementation of 20 strategic objectives, which are broadly categorized into the following umbrella objectives: i) education and communication; ii) research and development of national road safety; iii) infrastructure and road engineering; iv) management, control and monitoring of road standards and health assistance; and v) coordination and leadership of the National Road Safety Plan. The plan provides a sound basis from which a solid program can be developed and measurable outcomes achieved, but it falls short of identifying concrete actions and investment/funding flows to ensure this. The plan also reflects intrinsic political will and commitment to road safety and is also the result of multi-sectoral consultations and collaboration, building on partnerships and working relationships nurtured by the CNSV. However, its core partnership focus is quite narrow and principally aims to reduce crashes attributed to user behavior, particularly due to alcohol consumption and speeding.

**Box 7-2: Peru’s National Road Safety Council (Consejo Nacional de Seguridad Vial)**

The CNSV was initially authorized by Supreme Decree 010-96-MTC in 1996 and began its duties in 1997. The CNSV and its working body – the technical secretariat - are very small and have a limited budget and thus limited effectiveness. However, the technical secretariat proposed the adoption of the first national policy on road safety in order to combat the public health burden caused by vehicle accidents. Recently the budget assigned to the CNSV has been increased from US$100,000 to US$300,000 annually, a still limited amount when compared to the responsibilities assigned to that institution. The CNSV is comprised of four ministries – Transport, Interior, Health, and Education. The current level of representation on the agency’s board is low. Indeed, even the MTC itself is represented by a ministerial appointee (rather than the minister herself). Further, the concerned ministries have not allocated significant decision making authority to CNSV to carry out its mandate.

The MTC, through the CNSV, is responsible for “promoting and implementing policies aimed at ensuring road safety by designing policies aimed at promoting education and road safety as a mechanism for the prevention of traffic crashes” in Peru. The role of CNSV is to “promote coordination of actions at the inter-institutional level, in order to establish national policy on road safety in the medium and long term and prevent the occurrence of traffic crashes.” The National Plan “was adopted in order to determine a plan of action” to follow by the participating sector members of the CNSV (Transport, Interior, Health, and Education).

*Lack of an effective lead agency that can set policy and direct implementation to oversee the achievement of results.* The most challenging aspect of the road safety problem is the lack of authority, capacity, resources, and skills within the CNSV, which is responsible for ensuring and overseeing the implementation of road safety policies and programs. At present accountability streams are unclear, and there is a lack of credible funding to support the delivery of a solid safety program. Due to resource limitations, current monitoring and evaluation is weak. In order to assume a lead role, the CNSV will need to build capacity and credibility through strategic investments in strengthening institutional functions, ensuring sound coordination between the various actors, and achieving measurable results within the short term. Over the medium to long term, a sustainable mechanism for funding the CNSV will have to be established, with the requisite regulatory and legal mechanisms/framework set in place in order to ensure its autonomy and authority.

**SECTOR STRUCTURE AND OWNERSHIP OF ASSETS**

After 1994, the Peruvian regulatory framework opened up the possibility for private investments in infrastructure. The first project to benefit was the concession of the Arequipa-Maratani road. Almost 15 years later, Peru now has a number of concessions in the four sub-sectors of roads, railways, ports and
airports.

In addition to MEF, three key actors are in charge of the various aspects of managing private sector participation in infrastructure: (1) the Ministry of Transport and Communications defines the policies for the sector, including technical standards, and represents the GoP in awarding the concession contracts; (2) ProInversión is in charge of promoting private sector participation and of managing the procurement process until the concession contract is awarded; and (3) OSITRAN\(^1\) is in charge of regulating the markets of concession operators and of supervising concession contracts.

**Public and private participation in roads**

The Road Development Plan for 1996-2005 proposed the concessioning of eleven “road networks,” totaling about 7,000 km. Each of these “networks” combines high traffic road segments (more than 5,000 vpd) with low traffic ones (less than 2,000 vpd). To date, nine of these networks have been concessioned, for a total of 4,031 km.

**Table 7-6: Peruvian road concessions**

<table>
<thead>
<tr>
<th>Road</th>
<th>Length (km)</th>
<th>Characteristics</th>
<th>Concessionaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ancón-Huacho-Pativilca *</td>
<td>182.66</td>
<td>25-year concession US$61.4 million investment Basic toll(^1): US$1.50+tax</td>
<td>Norvial S.A.</td>
</tr>
<tr>
<td>Eje Multimodal Amazonas Norte (IIRSA(^1) Norte)</td>
<td>955</td>
<td>25-year concession US$280 million investment Basic toll: US$1.50+tax</td>
<td>IIRSA Norte S.A.</td>
</tr>
<tr>
<td>Pucusana-Ica *</td>
<td>221.7</td>
<td>30-year concession US$157.7 million investment Basic toll: US$1.50+tax</td>
<td>COVIPERU</td>
</tr>
<tr>
<td>San Juan de Marcona-Nazca-Chalhuancá-Abancay-Cusco (IIRSA Sur-segment 1)</td>
<td>757</td>
<td>25-year BOT concession US$83 million investment US$11 million annual operation</td>
<td>Survial S.A.</td>
</tr>
<tr>
<td>Inambari–Iñapari (IIRSA Sur-segment 3)</td>
<td>403.2</td>
<td>25-year concession US$40.7 million investment Basic toll: US$1.50+tax</td>
<td>Interoceánico Sur – Tramo 3 S.A.</td>
</tr>
<tr>
<td>Inambari–Azángaro (IIRSA Sur-segment 4)</td>
<td>305.9</td>
<td>25-year concession US$205 million investment Basic toll: US$1.50+tax</td>
<td>INTERSUR Concesiones S.A.</td>
</tr>
<tr>
<td>Empalme 1B-Buenos Aires-</td>
<td>78.1</td>
<td>15-year concession</td>
<td>Canchaque S.A.</td>
</tr>
</tbody>
</table>

\(^{15}\) Spanish acronym for *Organismo Supervisor de la Inversión en Infraestructura de Transporte de Uso Público* (Peruvian transport regulation agency)

\(^{16}\) The toll rate is US$0.15 per km; toll stations are located approximately every 100km where users are assessed US$1.50.

\(^{17}\) Initiative for the Integration of the South America Regional Infrastructure
Private participation in railways

The 1993 reforms opened the possibility for private participation in the railway sector that was until then managed by the public operator ENAFER\(^\text{18}\). A concession model was designed with a specific concessionaire in charge of administrating and maintaining the infrastructure and an operator which could use the infrastructure to provide transport services at a given cost. To make the concession more attractive, the infrastructure operator was given the possibility during the first five years to use part of the revenues that should normally have been devolved to the GoP, to rehabilitate the railways. The service operator was also authorized to be a “divisible consortium” (i.e., that would have to submit a single proposal but could be divided to administer independently the various railways’ lines). Finally, the concessionaire was expected to reach within five years the standards imposed by the United States Federal Railroad Administration (FRA). As of today, two concessions have been awarded under this model, to Ferrocarril Central and Ferrocarril del Sur y Sur Oriente. Overall, private participation in the railway sector has had a positive impact on the efficiency and development of this transport mode in Peru.

The Ferrocarril Central concession. The concession was awarded in 1999 to Central Andino S.A. The concessionaire operates both the infrastructure and the service. The length of the railroad is 590.9 km, separated in two segments: Callao-La Oroya-Cerro de Pasco and La Oroya-Huánuco. No investment was required in the concession contract. However, the concessionaire was required to reach the Class II standards of the U.S. FRA.

The Ferrocarril del Sur y Sur Oriente concession. The concession was awarded in 1999 to Ferrocarril Transandino S.A. to operate the transport services. Two segments are included in the concession contract: Matarani-Juliaca-Cusco (915.2 km), including a connection between Juliaca and Puno, and Cusco-Machu Picchu (134 km). The infrastructure is managed by Perú Rail S.A. No investment was required except the part of the revenues that should have gone to the GoP for the first five years. It was expected that Ferrocarril Transandina S.A. would invest about US$30 million over the period 2000-2005.

Private participation in ports

In 1997, the GoP decided to increase the participation of the private sector in port activities, with the creation of the Special Commission for Port Privatization (CEPRI Puertos). Seven port concession projects were then considered (Paita, Salaverry, Chimbote, Callao, San Martín, Matarani, and Ilo). In 1999, the tender for the ports of Ilo and Matarani was launched, resulting successfully only in the case of Matarani. However, the Peruvian Congress did not authorize other concessions until a regulatory framework is approved for the port sector. This was achieved only after the Port Law No. 27943 and its secondary legislations were passed in respectively 2003 and 2004.

The Matarani concession. The port terminal of Matarani is located in southern Peru and is connected to four main transport corridors (the Panamericana Sur, Bidireccional, and Costanera roads, and the Ferrocarril del Sur railroad), thus providing access to most of the south of Peru and part of Bolivia. The concession was awarded in 1999 to Terminal Internacional del Sur S.A. (TISUR). The concession

\(^{18}\) Spanish acronym for Empresa Nacional de Ferrocarriles del Perú (National Railway Company)
contract required the concessionaire to invest US$4.6 million in the first five years, an amount that was increased to US$5.7 million in 2001, and to which the concessionaire accepted to add additional investments of US$9.5 million. In 2006, the concessionaire had spent US$7.3 million in required investments plus an additional US$15.7 million to finance a cutting-edge system for minerals.

Callao and “Muelle Sur.” As a result of the port reforms adopted on April 29, 2008, the building of a new container wharf (Muelle Sur) in Callao was initiated with the objective of increasing by 40 percent the capacity of the first Peruvian port to receive boats and handle containers. The investments involved amount to US$120 million, to be increased to US$200 million in a second phase. These works were part of a 30-year concession contract awarded to the consortium Terminal Internacional de Contenedores del Callao (constituted of the British firm P&O Ports, the UAE19 firm DP World, and the Spanish firm Uniport) for the design, construction, financing, operation, and maintenance of the terminal. The objective is to make of Callao the first “hub” on the western coast of South America with an annual capacity of 850,000 TEUs for Muelle Sur, to be increased to 1.2 million TEUs in the second phase. The works are expected to be concluded at the end of 2010.

Latest port concession projects. The concession for the modernization of the Pisco port (Terminal General San Martin) is scheduled to be awarded in 2009. The concession was delayed because the MTC needs to assess whether it can be an auto-financed concession or whether some level of public financing may be required. The new Ventanilla terminal was proposed by Operadora Portuaria (from the logistics group Neptunia). The terminal is expected to begin operations by the end of 2009. The concessioning of other regional ports (Paita, Chimbote, Salavery, and Ilo) are planned. Some of them will be implemented as part of Peru’s stimulus package. For others, no precise date has yet been set. The building by a Chinese consortium (Shandong Luneng Group) of a new port in Tacna was also proposed.

Private participation in airports

The GoP has envisaged the concessioning of the main Peruvian airports since 1992. The initial plan was to put in concession for 30 to 40 years a first lot of five airports (Lima-Callao, Iquitos, Cusco, Trujillo, and Arequipa) with an envisaged investment of US$500 million. This strategy was then modified to put in concession the Lima-Callao airport with the objective of maximizing revenues for the GoP.

Lima-Callao airport. Lima’s airport has been operated since 2001 by the German company Fraport AG. The concession contract required a minimum investment of US$100 million as well as other additional investments depending on the evolution of air passenger traffic. In August 2007, Fraport AG increased its stake in the Lima airport from 42.75 to 100 percent.

Other airport concession projects. A contract for the modernization of 9 regional airports (Tumbes, Talara, Trujillo, Cajamarca, Anta, Ancash, Chachapoyas, Iquitos, and Pucallpa) was awarded in 2006 to the GBH-Swissport consortium. Several other regional airports in Southern Peru are planned to be concessioned, possibly as a single concession involving also the building of new airports in Madre de Dios and Tacna. Those include: Andahuaylas (Apurimac), Arequipa, Ayacucho, and Juliaca (Puno), and Nazca (Ica). The concession of the Cusco airport is also scheduled (including the building of a new terminal in Chincheros). Some of these airport concessions will be implemented as part of Peru’s stimulus package.

Lessons from the concessions in the transport sector in Peru

19 United Arab Emirates
The success of Muelle Sur. Although the Muelle Sur concession will not provide a long-term solution to the saturation problems of the port of Callao, this concession has been a major breakthrough to increasing capacity in the short and medium-term and to include some degree of competition with the low-performing ENAPU model. Success also comes from the sound design of the concession, looking ahead in terms of port services demand. For example, the concession has been designed in order to be able to handle larger boats (Panamax and Post-Panamax) that require a minimum depth of respectively 12.5 and 14m (the other Callao wharves have a maximum depth of 10.5m). For this purpose dredging activities have also been included in the concession contract. A detailed environmental impact study is also being prepared.

The lessons of IIRSA\textsuperscript{20} Sur. The IIRSA Sur is a 2,586 km road corridor that connects ports on the Southern Peruvian coast with the small town of Iñapari (Madre de Dios) in the Amazon forest, near the Brazilian border. The IIRSA Sur was launched in 2005 and, as of 2008, works were only partially completed. Several firms, organized in consortia, are involved in the Public-Private Partnership (PPP) arrangement that was designed to build and operate this road. Both because of the size of the works and their location (some sections cross the Peruvian Selva, an area of high environmental sensitivity), the IIRSA Sur has received a lot of attention from civil society. Three Congressional commissions have reviewed the IIRSA Sur and criticisms have been formulated regarding some aspects related to design and implementation.

One of the main problems faced by the IIRSA Sur comes from the underestimation of costs in the pre-feasibility study that was initially performed. In order to speed up execution under a context of high political pressure to start the works, most of the Peruvian standard quality control procedures were bypassed. Furthermore, the project was not assessed by SNIP\textsuperscript{21} and neither detailed technical designs nor a strategic environmental evaluation were prepared at the time of approval. The PPP contract was designed under the assumption that total project costs would amount to US$850 million and that the cost overrun risk would be retained by the government. In 2008, a financing gap of US$750 million was estimated to complete the works, but this amount may end up being even higher considering that the remaining sections will be the most difficult to build. However, after considering the extent of the works already completed, as well as the high social demand from the southern regions, the new Peruvian administration decided to finance the completion of the works under a new contracting arrangement. This restructuring of the IIRSA Sur project should be an opportunity to have a second look at this project, particularly on the management of social and environmental issues, on the technical alternatives that will be used in order to limit the risks of additional cost overruns, and on the planning and regulation of such types of projects. In this regard, while the primary reason for the current situation is mostly due to the bypassing of control mechanisms caused by political interference in the process, the ignoring of several red flags waved during implementation highlights deficiencies in the management and regulation framework for such types of projects. The multiplicity of actors involved (ProInversión, OSITRAN, MTC) may have contributed to a dilution of accountability and a weakening of the regulatory mechanisms for this project.

\textsuperscript{20} IIRSA means the Initiative for the Integration of Regional Infrastructure in South America. This initiative identifies key infrastructure investments that are essential to South American physical integration. Peru is involved in four IIRSA corridors: (i) the Amazon corridor (Peru, Ecuador, Colombia, Brazil); (ii) the Peru-Brazil-Bolivia corridor; (iii) the Interoceanic corridor (Brazil-Paraguay-Bolivia-Peru-Chile); and (iv) the Andean corridor (Peru-Ecuador-Colombia-Venezuela-Bolivia-Chile)

\textsuperscript{21} National System of Public Investment
Finally, the costs of the IIRSA Sur for the GoP budget may create a significant fiscal risk for the MTC. While in 2008 payment under the existing PPP arrangement amounted to about 15 percent of Provías Nacional’s investment budget, this proportion could reach about 60 percent in absence of additional budget resources. This fiscal risk could threaten road maintenance expenditures or at least severely restrict the capacity of MTC to expand its road maintenance activities.

The future of private participation in transport in the context of Peru’s stimulus package

*The package focuses largely on transport investments.* The government package takes into account the lessons from the last macroeconomic crisis faced by Peru at the end of the 1990s when infrastructure spending was severely downsized as part of the country’s fiscal adjustment policies, resulting in the loss of competitiveness and growth. The package gives particular attention to a few selected “mega-projects,” most of them in transport. They include in particular the completion of the IIRSA Sur project (an additional US$900 million needed), the concession of six regional ports (US$591 million), the upgrading of the Ayacucho – Abancay road (US$433 million), the concession of the IIRSA Centro (US$220 million), the concession of six regional airports (US$157 million), and the construction of the infrastructure needed for the Tren Electrico, a new Lima urban transport system. These mega-projects – except the IIRSA Sur and the Tren Electrico, as well as a few other road rehabilitation and bridge reconstruction investments – have been publicly announced in two Emergency Decrees: *Decreto de Urgencia* No. 047-2008, dated December 18, 2008, and No. 010-2009, dated January 29, 2009. As part of the stimulus package, the government has also announced the creation of a US$100 million infrastructure fund, managed by COFIDE, in order to support some of the PPP infrastructure investments.

Table 7-7: Transport investments flagged as priorities in Peru’s stimulus package

<table>
<thead>
<tr>
<th>D.U. No. 047-2008 (ports, airports and new roads)</th>
<th>D.U. No. 010-2009 (road rehabilitation and bridge constr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td><strong>Estimated cost</strong></td>
</tr>
<tr>
<td>Port of Paita</td>
<td>US$232m</td>
</tr>
<tr>
<td>Port of San Martín (Pisco)</td>
<td>US$113m</td>
</tr>
<tr>
<td>Port of Salaverry</td>
<td>US$159m</td>
</tr>
<tr>
<td>Port of Pucallpa</td>
<td>US$17m</td>
</tr>
<tr>
<td>Port of Iquitos</td>
<td>US$15m</td>
</tr>
<tr>
<td>Port of Yurimaguas</td>
<td>US$61m</td>
</tr>
<tr>
<td>Highway “Autopista del Sol”</td>
<td>US$170m</td>
</tr>
<tr>
<td>Highway IIRSA Centro</td>
<td>US$220m</td>
</tr>
<tr>
<td>2nd group of regional airports</td>
<td>US$157m</td>
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Some of the prioritized projects may attract private operators. ProInversión is leading the concessioning of the transport investments prioritized in D.U. No. 047-2008. Some of these investments are indeed

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22 Development Financial Corporation
sufficiently attractive so that private financing could be leveraged through Public Private Partnership (PPP) arrangements, despite the current difficulties in accessing financial markets. In that sense, the stimulus package is an opportunity to continue advancing the PPP agenda in the transport sector in Peru. However, some of the prioritized projects do not have a clear financial profitability, and the bulk of the financing is therefore expected to ultimately come from public sources. It is therefore important to evaluate realistically which contingent liabilities may be generated from the initial contracting arrangements of these “mega-projects.”

Public operators

Port sector. The state-owned enterprise ENAPU operates most Peruvian ports, with the exception of Matarani and the new Callao terminal. There is ample evidence that ENAPU has serious efficiency problems, resulting in port services that are both expensive and with medium- to low-quality standards. The absence of modern equipment such as port cranes, combined with other sources of inefficiencies, result in low productivity ratios: for example, only 16 containers are moved per hour in Callao, compared to 80 or more in other ports of the region. ENAPU’s over-costs are generated by the current pension system (as well as associated liabilities), an over-dimensional workforce and by cross-subsidies to lower-capacity ports. It has been estimated that ENAPU’s cost structure could be halved with the same level of activity, resulting in savings of about US$13 million per year. A thorough port reform program could result in increased competitiveness and in benefits for Peruvian consumers, arising from ultimately lower costs for imported goods.

Resistance to private participation. Resistance is particularly acute in the port sector, with unions opposing private participation (particularly foreign) and the regional governments of Ica and Loreto preferring to keep the management of regional ports and offering to pay for their modernization (US$30 million in the case of the Pisco port and US$18 million for the Iquitos port).

Constraints on the supply side: the risks of a saturated construction sector

A risk that has diminished with the economic downturn but which could reappear. Before the global financial crisis, the construction sector in Peru was booming and, in some cases, showing signs of saturation, while an inflation of unit prices was also observed. The new context has reduced the risk of saturation. However, the sustained public investments in infrastructure that is envisaged as part of Peru’s stimulus package may still generate tensions on the supply side, particularly if the international economic situation improves in 2010. The situation of the construction sector should therefore still be closely monitored. The GoP should also consider taking measures that could increase competition (e.g., revised procurement rules encouraging the development of mid-size Peruvian firms or a greater opening to international competition).

An important contribution to GDP growth. After experiencing a contraction during the years 1999-2001, the construction sector more recently has been a significant contributor to the current economic growth experienced by Peru. In 2002, the GDP of the construction sector increased by almost 8 percent (three points higher than the Peru’s GDP) and by 14.7 and 16.5 percent respectively in 2006 and 2007 (twice the total GDP growth). In April 2008, this growth achieved 34 percent compared to the previous month. Although the demand in this sector is expected to remain high until 2011, Peru’s central bank estimates that high prices and a limited capacity are constraining the development potential of the sector.

Sector structure. The Peruvian construction sector consists of six cement enterprises, two steel factories, and a brick industry, which is 80 percent informal. According to the Peruvian Central Bank, the cement industry reached 85 percent of its installed capacity in 2008. However, some investments are continuing,
in order to increase this capacity. Similarly, the steel factories are increasing their capacity to respond to a
demand that has nearly doubled, and to take advantage of the price increase (a 36 percent increase
between January and April 2008).

*The increase in road works from 2005 up to the global crisis.* Before the global economic downturn, the
high demand for construction works had been translating into higher prices. Mid-size construction firms
could obtain returns-on-investment higher than 50 percent. They were adding an “I’m busy” premium to
their quotations and picking up the best opportunities.

*Constraints limiting private sector capacity.* Before the downturn, the most important constraint faced by
the private sector was related to the recruiting of professionals, particularly engineers. The tensions in the
market for qualified labor have, however, decreased. The most important Peruvian road construction firm
(Graña y Montero) has invested 125,000 hours into training its staff, which includes 240 newly recruited
engineers. Another major constraint for the road sector used to be the reduced availability of construction
equipment. Executives from major Peruvian construction firms reported that delays for the delivery of
imported road construction equipment had increased from six to eight months to more than a year. Firms
also had to invest in land acquisition in order to increase their stocking capacity.

*Insufficient competition.* Over the past three years, many tenders launched by the MTC have experienced
a limited participation of bidders, some of them even resulting unsuccessful. In 2007, Provías
Descentralizado saw several bidding processes for works and for related technical studies and supervision
activities turn out unsuccessful because of the absence of bidders or bids exceeding reference prices by
more than 150 percent. Some adjustments to the bidding processes have helped make these tenders more
attractive, but the competition remains low. For larger works, international competitive bidding has
helped bring new actors and, recently, the Peruvian construction sector has been facing the competition of
foreign firms, mostly from Colombia, Brazil, Chile, and Spain. However, competition remains limited
due to the high demand and still constrained supply, particularly for smaller-size construction works.

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**POLICY, INSTITUTIONAL, AND REGULATORY FRAMEWORK**

**Main laws and regulations**

After the decade of the 1980s, when the Peruvian state intervened directly in most aspects of transport
policies, the 1990s were characterized by strong liberalization and deregulation reforms. Since 2000, a
number of pieces of legislation have been passed to refine the regulatory framework, to better ensure the
quality of infrastructure and services, and reduce the high levels of informality in the sector.

The main pillar of the Peruvian legislative framework in transport is the General Transport Law, passed in
1999. This law obliges the state to promote free competition in the sector, while remaining in charge of
those functions that are essential for society and that cannot be developed by the private sector. The law
states that all actors have to assume the costs associated with their decisions and the prices of services
have to be real and competitive, with the exception of corrections justified by negative externalities
caused by traffic congestion and pollution. Technical standards and regulatory measures should promote
the optimization of traffic management.

A number of secondary regulations were passed to complement the General Transport Law. The most
important ones include the National Regulation for the Administration of Transport (RENAT in Spanish),
which defines the organization of the Ministry of Transport and Communications, and the Supreme
Decree No. 017-2007-MTC, which defines the criteria to classify Peruvian roads in three categories: (1) the national road network formed by the country’s main longitudinal and transversal transport corridors; (2) the regional road network ensuring connectivity between the national and rural road networks and linking regional and provincial capital cities; and (3) the rural road network connecting populated areas with the municipal capital cities.

**Road transport services.** Road transport services and vehicles are regulated by several important pieces of legislation. These include: the Regulation for Compulsory Vehicle Insurance in Case of Road Accident (SOAT in Spanish), the National Regulation of Vehicles, and the National Transit Regulation. These three pieces regulate road transport services and ensure that vehicles are in compliance with technical and safety standards. Other pieces of regulation establish technical standards of the control of vehicles and weight regulation. These include the Emergency Decree No. 079-2000 that regulates vehicles weight and the import of used auto parts, and Law No. 29237, passed in 2008 to establish the National System of Technical Inspections. To improve Peru’s deteriorated road safety situation, the “Zero Tolerance” Supreme Decree was passed on October 29, 2006, in order to ensure that heavy vehicles going through a toll post are controlled to verify compliance with key safety and technical standards (including drivers’ licenses, vehicle insurance, and technical control certificates).

**Private participation.** The regulatory framework for private participation in infrastructure can be sorted into three main categories: (1) the regulation of the privatization of public enterprises; (2) the regulation of concessions; and (3) the regulation of the financing and institutional framework for the promotion of private participation in infrastructure. Historically, the first pieces of legislation authorizing private sector participation in infrastructure concessions were passed in 1991. They include Decree Law No. 758, which defines norms to promote private participation in infrastructure. In 1996, Decree Law 839 complemented these dispositions and the Supreme Decrees No. 059-96-PCM and 060-96-PCM introduced a regulatory framework for the concessions of infrastructure and public services. Supreme Decree No. 132-97-EF defined the fiscal dispositions applicable to revenues from infrastructure concessions. In 1997, Law No. 26885 introduced additional incentives to promote concessions in the infrastructure sectors. Law No. 27332, complemented by Supreme Decree No. 032-2001-PCM, defined the objectives, organization and operational principles of the regulatory entities in charge of regulating private investments in infrastructure. Laws No. 28742 and 28563 were passed in 2005 and 2006 in order to facilitate financing of the promotion of private participation in infrastructure, and so that MEF could grant guarantees to some concessions. There were followed by the Ministerial Resolution No. 496-2007-EF/75 that describes how contingent liabilities associated with concessions should be accounted for. Finally, Decree Law No. 1014 was passed in 2008 to further the promotion of private investment in infrastructure.

**Decentralization.** With the decentralization reforms gaining steam in 2001, a number of regulations were introduced to establish the framework for the decentralized management of infrastructure. An important one for transport is the Law No. 28059, entitled “Framework Law for Decentralized Investment.”

**Air transport.** Air transport is principally regulated by Civil Aviation Law No. 27261. Technical and operational issues related to air transport are regulated by secondary legislations issued by the MTC and by the Generate Directorate for Civil Aviation, as well as by international agreements subscribed by Peru. In 2005, another law (No. 28525) was passed to promote air transport services in Peru.

**Railways.** Railways are mostly regulated by the National Railway Regulation No. 032-2005-MTC. The scope of this Supreme Decree includes both: (1) the construction, improvement, rehabilitation, and

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23 President of the Council of Ministers
maintenance of railway infrastructure; and (2) railway transport services. Therefore institutions, infrastructure, equipment, operations, and services of railway activities, are all regulated. Finally, the decree also defines registry monitoring and fines for non-compliance.

Ports. Ports are primarily regulated by Law No. 27943, approved in 2003. The scope of the law includes activities and services in port terminals, infrastructure, and installations located in maritime and fluvial ports, either publicly or privately owned or managed. The law also aims at promoting the development and the competitiveness of Peruvian ports, at facilitating multi-modal transport and at modernizing port infrastructure and developing logistics chains. All maritime and fluvial activities are controlled following procedures defined by Law No. 26620. Finally, river-based transport services are regulated by Supreme Decree No. 014-2006-MTC, except for large boats which fall under the legislation applicable to maritime transport.

Multimodal transport. The Peruvian legislation also aims at promoting multimodal transport, through a specific piece of legislation (Decree-Law No. 714 and the associated secondary legislation). Multimodal international transport is identified as a key element to promoting international trade. The law defines Internal Terminals for Goods (TIC in Spanish) and intermodal transport contracts.

<table>
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<th>Box 7-3: Main legal and regulatory provisions</th>
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<tbody>
<tr>
<td><strong>Legal provision</strong></td>
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<tr>
<td>General Transport Law (October 8, 1999)</td>
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<tr>
<td>Incentives for Infrastructure Concession Law (No. 26885)</td>
</tr>
<tr>
<td>Private Investment Regulation Law (No. 27332)</td>
</tr>
<tr>
<td>Road Classification Decree (No. 017-2007-MTC)</td>
</tr>
<tr>
<td>National System of Technical (Inspections Law No. 29237, May 26, 2008)</td>
</tr>
<tr>
<td>National Regulation of Vehicles (DS 034-2001-MTC)</td>
</tr>
<tr>
<td>National Transit Regulation (DS 033-2001-MTC)</td>
</tr>
<tr>
<td>Civil Aviation Law (No. 27261)</td>
</tr>
<tr>
<td>Air Transport Promotion Law (No. 28525, May 25, 2005)</td>
</tr>
</tbody>
</table>
A complex but still incomplete regulatory framework

Despite the complexity of the Peruvian normative system for transport regulation, there are still some important areas where regulation objectives and procedures should be defined more precisely. More importantly, Peru still lacks a global strategy for transport regulation.

**Better coordination between the different levels of governments is still needed.** Peruvian subnational governments have been granted some degree of regulation responsibilities in the transport sector by the decentralization reforms. In many cases, however, these responsibilities cannot be efficiently exercised without better coordination among the other levels of governments.

**Other missing regulatory instruments.** A global transport regulation policy is still missing and existing regulatory instruments like RENAT\(^{24}\) still need to be updated. The creation in 2009 of the *Superintendencia de Transporte Terrestre* could be an opportunity to revisit the global regulatory framework, starting with land transport. In this context, a revision of RENAT, including a consultation of transport service operators, has been announced by the MTC.

**Institutional framework**

Multiple actors are associated with the design or implementation of Peru’s transport policies. The main actor is the Ministry of Transport and Communications (MTC). Since the decentralization reforms, subnational governments (regions and municipalities) have also been granted specific responsibilities, in particular regarding the management of the secondary and tertiary road networks.

*The Ministry of Transport and Communications.* The MTC is the main actor in charge of defining Peru’s transport strategies, policies, and technical norms. The Vice-Ministry of Transport includes five general directorates: (1) the General Directorate for civil aviation; (2) the General Directorate for sea and river-based transport; (3) the General Directorate for roads and railways; (4) the General Directorate for land transport; and (5) the General Directorate for social and environmental issues. The MTC is also constituted of “special programs”: Provías Nacional and Provías Descentralizado (resulting from the merging of Provías Rural and Provías Departamental in 2006\(^{25}\)). The two Províases are public entities with private statutes which give them a certain degree of technical, administrative, and financial autonomy. Provías Nacional is in charge of managing the national road network, while Provías

<table>
<thead>
<tr>
<th>National Railway Regulation (No. 032-2005-MTC)</th>
<th>Establish the norms and standards applicable to the railway sub-sector</th>
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<tbody>
<tr>
<td>National Port System Law (No. 27943, March 1, 2003)</td>
<td>Regulate port activities and services for both private and public ports and promote modernization and competitiveness</td>
</tr>
<tr>
<td>Multimodal Transport Decree (No. 714)</td>
<td>Promote multimodal transport and define custom procedures applicable to Internal Terminals for Goods</td>
</tr>
</tbody>
</table>

*Source: Tapia, J., CIDATT, 2009.*

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\(^{24}\) Spanish acronym for *Reglamento Nacional de Administración de Transportes* (National Transport Administration Regulations)

\(^{25}\) Supreme Decree No. 029-2006-MTC.
Descentralizado supervises and provides support to subnational governments in the management of their respective road networks. The MTC also oversees three state-owned enterprises: CORPAC in the air transport sub-sector, ENAPU in the port sub-sector, and SERPOST S.A. for postal activities.

The new Superintendencia de Transporte Terrestre. Announced in June 2009, this new autonomous entity is expected to become the main regulator for land transport (including road safety issues, the control of vehicles and infrastructure’s compliance with the applicable standards). The secondary legislation (reglamento) of the new entity should help clarify the exact responsibilities and operational procedures of the Superintendencia. This will be a delicate but very important exercise, due to the transversal nature of the new entity’s missions and the risks of duplicating or generating conflicts with MTC’s other entities.

Entities in charge of promoting or regulating private participation in transport. These include OSITRAN, whose objectives are to regulate the markets of enterprises that are operating transport services as well as concession contracts, taking into account the interests of the government, users, and private investors, within the normative framework defined by the MTC. The National Port Authority (APN) is a “decentralized public entity” in charge of strategic planning for the port sector, of defining the normative framework to promote private sector participation, and of supervising its implementation. Finally, ProInversión is in charge of promoting private participation, particularly through concessions, and MEF of ensuring the economic relevance of public investments.

Subnational governments. Since Peru’s decentralization reforms, regional governments have been in charge of the management of regional roads, and municipal governments of rural roads. In doing so, they have had to comply with the technical standards set by the MTC (e.g., applicable to low-traffic roads) and by MEF (e.g., use of specific intergovernmental transfer for routine road maintenance).

<table>
<thead>
<tr>
<th>Agency/Organization</th>
<th>Functions</th>
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</thead>
<tbody>
<tr>
<td>Ministry of Transport and Communications (MTC)</td>
<td>Design and implement policies and strategies to integrate Peru with an efficient transport system</td>
</tr>
<tr>
<td>OSITRAN</td>
<td>Regulate concessions’ contracts</td>
</tr>
<tr>
<td>National Port Authority (APN)</td>
<td>Promote the development and international competitiveness of Peruvian ports; facilitate multimodal transport; promote the modernization of port installations and logistic chains</td>
</tr>
<tr>
<td>ProInversión</td>
<td>Formulate, propose and implement national concession policies</td>
</tr>
<tr>
<td>Regional Governments</td>
<td>Manage the secondary road network (regional/departmental roads) as well as other regional transport infrastructure (ports, airports); regulate inter-provincial transport</td>
</tr>
<tr>
<td>Municipal Governments (provincial and district)</td>
<td>Manage the tertiary road network (rural roads) and regulate minor transport services (e.g., moto taxis)</td>
</tr>
</tbody>
</table>

26 Spanish acronym for Corporación Peruana de Aeropuertos y Aviación Comercial (Peruvian Corporation of Airports and Commercial Aviation)
27 Spanish acronym for Empresa Nacional de Puertos S.A. (National Port Company)
28 Spanish acronym for Servicios Postales del Perú (Peruvian Postal Services)
Entities representing the interests of users or of the private sector. INDECOPI\(^{29}\) is in charge of the protection of consumers, who includes users of transport services. Transport users are also represented by CONUDFI (Consejo Nacional de Usuarios del Sistema de Distribución Física Internacional de Mercancías) for exporting enterprises, Chambers of Commerce and CONFIEP (Confederación Nacional de Instituciones Empresariales Privadas) for other enterprises, ASPEC (Asociación Peruana de Consumidores y Usuarios) for general consumers (e.g., for road safety). Several associations voice the concerns of transporters like UNT Perú (Unión Nacional de Transportistas Dueños de Camiones del Perú), ANATEC (Asociación Nacional del Transporte Terrestre de Carga), APOIP (Asociación de Propietarios de Ómnibus Interprovinciales), and COTRAP (Confederación de Transportadores del Perú). Finally, AFIN (Asociación para el Fomento de la Infraestructura Nacional) was created in 1996 to represent the interests of private concessionaires of transport infrastructure.

Other actors include the National Police (to enforce transport regulations on Peruvian roads); the Health Ministry (on road safety as well as the impact of transport-caused environmental degradation on human health); MINCETUR (tourism-linked transport); and SUNAT\(^{30}\) (to collect transport-related fees and accredit enterprises in charge of vehicle inspections).

Incomplete transport decentralization, particularly at the regional level

The successful experience of the rural roads program. Since 1995, the GoP, with the help of the World Bank and the Inter-American Development Bank (IADB), has successfully designed and implemented an innovative approach to road management in the poorest areas of rural Peru. The approach developed by the First and Second Rural Road Projects first aims at empowering the rural poor in the process of selecting rural roads in need of rehabilitation. More than 100 provincial participatory road plans have been prepared through the organization of community workshops. These plans prioritize among road segments, to identify the ones that are most critical to the needs of the poor and most likely to help spur

\(^{29}\) Spanish acronym for Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (National Institute for the Defense of Competition and the Protection of Intellectual Property

\(^{30}\) Spanish acronym for Superintendencia Nacional de Administracion Tributaria
productive activities. The project has been considering all the main transport modes of the rural poor: rural roads as well as non-motorized tracks (caminos de herradura) for the extreme poor and even fluvial transport for the communities living in the Amazonian regions. Several organizations called “local development windows” were also created to help identify productive activities that would become feasible, thanks to the improvement of transport conditions.

**Impact on rural welfare is limited by the scope of the program.** In 2005, a thorough evaluation of the Second Rural Road Project was performed, illustrating the improvement in transport conditions (a 68 percent reduction in travel time) as well as its impact on access to schools (an 8 percent increase in enrollment) and health centers (a 55 percent increase in visits), agricultural productivity (a 16 percent increase in land destined to agriculture), and rural income (a 20 percent increase in men’s agricultural salaries). A more positive trend in poverty and extreme poverty indicators was also observed in the project’s areas, compared to the other areas not covered. This effect on poverty is expected to become stronger over time. These positive benefits are, however, limited by the scope of the program (less that a third of the Peruvian registered road network and a very small proportion of the non-motorized tracks have been rehabilitated over the past 13 years).

**A sound institutional model but still to be fully generalized.** Building on the ongoing decentralization reforms in Peru, the management of rural roads has continued to be handed over to provincial municipalities, along with the corresponding budgetary resources and technical expertise. Provincial road institutes (PRIs) have been created, under the authority of provincial road boards, which include all the mayors from the province. These institutes, of which there are more than 100 so far, and of which 38 have reached full capacity, contract out the maintenance of the newly created roads to microenterprises, created by men and women from the poorest rural communities. One of the main advantages of the PRIs is that they ensure greater cooperation between district municipalities, thus helping to overcome the high fragmentation of the Peruvian municipal sector. With 2,006 district and provincial municipalities, the average size of Peruvian municipalities is three to seven times smaller than regional comparators. However, there are only 194 provincial municipalities. The provincial level seems to be the best level for managing rural roads since it both ensures sufficient proximity to users to improve accountability but also generates economies of scale. However, less than a quarter of Peruvian provincial municipalities can now count on a full capacity PRI.

**Cost-effective rehabilitation and maintenance alternatives are sometimes challenged.** As of today, more than 14,000 km of rural roads have been rehabilitated under the projects and are receiving adequate routine maintenance contracted out to microenterprises. The technology used for road rehabilitation (gravel roads) was about a quarter of the cost of other alternatives like paved roads. Before the projects, low cost alternatives, like gravel roads, were discarded because communities knew they were not going to last. After a decade of experience, communities have now learned that gravel roads are a sustainable option provided adequate maintenance is performed, as well as a cost-effective alternative, given the traffic observed on Peruvian rural roads. Nevertheless, with the municipalities receiving higher revenues, particularly from the booming mining activities (canon minero), the political pressure and social demand for higher standards has been increasing. Some municipalities have paved some roads, even though traffic levels did not justify such investments.

**Scaling up the model.** In 2007, the GoP launched the Decentralized Rural Transport Project to further the results of the First and Second Rural Roads Project and to extend this successfully to the entire country. Critical challenges include: enhancing impact with greater complementarities between transport and other rural infrastructure investments, building sufficient institutional capacity at the municipal level (in particular through the strengthening of the Provincial Road Institutes) and maintaining the maintenance system with microenterprises, in the fully decentralized context.
The new challenges of regional transport. After the 2002 decentralization reforms that transferred more power to the newly elected regional governments, and after taking stock of the successes of the rural roads program, the GoP in 2005 launched the Regional Transport Decentralization Project (Programa de Caminos Departamentales). The project aims at promoting, in all 24 Peruvian regions, sound management practices of road assets, in particular by improving the prioritization, efficiency, and effectiveness of road improvement interventions. As of 2008, this program had had only limited results due to major institutional weaknesses in the regional governments, reduced interest of regional governments for the low-cost standards (gravel roads) proposed by the program even though they were economically justified, uncertainties created by the road reclassifications launched by the GoP in 2007, and competition with other sources of financing (other resources available to regional governments such as “canon minero” but also national instruments such as FONIPREL\(^{31}\)). Institutional capacities at the regional level are constrained by numerous factors, including salary scales that make it difficult to hire qualified staff, but also duplicate institutional arrangements between the Regional Transport Directorate, which formerly reported to MTC, and the Infrastructure Management Units (gerencias de infraestructura). Although the Regional Transport Decentralization Project included an aggressive institutional strengthening package to accompany these reforms, results have so far been limited and many challenges remain. Finally, the planning instruments used by regional governments to prioritize their investments in infrastructure need to be updated, to account for the changes in Peru’s macroeconomic conditions in the past five years.

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PLANNING AND INVESTMENT PROCESSES

Planning instruments

Planning instruments in Peru are prioritized through different planning instruments. The most important is the Intermodal Transport Plan 2004-2023, which sets the medium to long-term vision for the sector. Other planning instruments that are relevant for the national road network include the five-year National Road Plan 2006-2010 and the National Road Maintenance Plan 2000-2009. The ambitious National Road Plan aims in particular at integrating populated areas with productive and touristic areas. The plan prioritizes three major road corridors including segments from (1) the coastal Panamericana road; (2) the longitudinal road of the Sierra; and (3) the Marginal de la Sierra road.

The recent Proyecto Perú program was designed using a different planning methodology than the existing National Road Plan. The selected investments were listed in Ministerial Resolutions No. 223-2007-MTC-02 and 408-2007-MTC/02. The Proyecto Perú program prioritized 35 road corridors (for a total length of 14,000 km) as well as four river-based corridors connecting production centers with national and international markets.

Logistics

Over the period 2003-2007, Peruvian exports grew by close to 30 percent per year. However, the investment in the logistics system has been far less. Peru still lacks an investment strategy that could help it face the challenges of global trade integration and optimize its logistics chains. The national multimodal transport plan is outdated and does not reflect the economic boom experienced by Peru over the past five years.

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\(^{31}\) Spanish acronym for Fondo de Promoción a la Inversión Pública Regional y Local (Regional and Local Investment Promoting Fund)
years, nor the opportunities that will open under the free trade agreements (FTAs, or TLC in Spanish\textsuperscript{32}) negotiated by Peru with its main trade partners.

A comprehensive logistics strategy is still needed. The growth of the mining industry is starting to be constrained by the lack of transport infrastructure and this phenomenon is likely to be aggravated in the short term, considering the large number of mining development projects. A national logistics plan should also help develop a major port hub (in Callao or elsewhere, considering the physical constraints to port expansion in Callao), consolidate the airport hub of Lima-Callao, and further intermodal integration. The underutilized potential of river-based transport also needs to be addressed. Three Peruvian river ports present a particular interest for multimodal transport: Iquitos, Pucallpa, and Yurimaguas. However, Iquitos is currently the only port equipped to transfer containers and this port therefore has a particular relevance in terms of multimodal integration.

A supply chain approach to Peruvian trade flows could help formalize an assessment of existing bottlenecks in the transport sector and provide a sound background to the preparation of a logistics strategy for Peru. A supply chain is a system of resources, organizations, people, technologies, activities, and information involved in the process of transporting goods from producers to consumers/users. Supply Chain Security (SCS) looks into threats to the supply chain and the consequent threats to the economic, social, and physical wellbeing of citizens and organized society. SCS (e.g., ISPS\textsuperscript{33} port security standards) is becoming increasingly important for global trade.

**Transport planning at the subnational level**

Following the 2002 decentralization reforms, and with the support of MTC’s programs managed by Províñas Descentralizado (Regional Transport Decentralization Project, Decentralized Rural Transport Project), subnational governments have been developing participatory road plans. These plans have been particularly successful at the provincial level where they managed to overcome Peru’s municipal fragmentation and formalize a joint planning and financing strategy for rural roads expansion. More than two-thirds of Peruvian provinces now have a participatory provincial road plan and many of them have already updated their five-year old road plans. At the regional level, on the other hand, the experience has been mixed, since these plans have so far failed in providing a strategic tool to influence the vision of regional transport, and are mostly perceived as a way to select the two road segments that could receive financing from the national government. In addition, many regional plans have not been updated to take into account the macroeconomic evolution of Peru over the past four years as well as the recent road reclassifications; in addition, the plans’ priorities are sometimes challenged by the new administrations that took power after the last regional elections.

**SECTOR INVESTMENT AND FINANCING**

**Transport investments**

In Peru, the last significant increase in transport infrastructure spending occurred at the beginning of the

\textsuperscript{32} Spanish acronym for Tratado de Libre Comercio (Free Trade Agreements)

\textsuperscript{33} International Ship and Port Facility Security
1990s, when the national road network was on the verge of collapsing, with only 12 percent of roads in good condition. That program almost quadrupled the length of roads in good condition over five years. Infrastructure spending was then severely constrained, in Peru as well as in other Latin America countries, during the economic downturn of the late 1990s, when capital expenditures paid the highest price in the fiscal adjustment that were implemented in response to the macroeconomic crisis. In the context of the current global economic downturn, Peru is currently adopting a radically different approach with a countercyclical economic stimulus package focused in particular on increasing financing for the infrastructure sectors.

**Figure 7-5: Evolution of transport investments**

![Graph showing the evolution of transport investments](image)

Source: IPE

*Private financing.* Though still relatively small, private financing in transport has been increasing since 2000 (despite a decrease observed in 2005). The government is encouraging further private financing through an ambitious concession and PPP program.

*Airport investments.* In August 2006, investments of US$124 million over the next 25 years were approved by MTC to modernize regional airports. As part of this plan, a first contract for the modernization of nine regional airports was awarded in 2006 and a second contract is being prepared.

*Ports.* It is estimated that US$1.2 billion are needed in order to modernize Peruvian ports.34

**Public expenditures in transport**

*High volatility of public expenditures.* As in many other Latin American and Caribbean (LAC) countries, the infrastructure sectors – particularly transport – have absorbed a large share of the fiscal adjustments taking place over the past two decades. This cyclical volatility has penalized to some degree the capacity of the countries in investing in productive infrastructure and promoting economic growth (Calderón and Servén, 2003). After the economic crisis of the late 1980s, when Peru experienced high inflation rates, the

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34 *Instituto Peruano de Economía*, 2005
fiscal situation improved, resulting in more fiscal space for capital expenditures. Between 1992 and 2000, the GoP obtained external financing for a total amount of US$1.8 billion to finance its investment program in the transport sector, the bulk of it going to finance improvements on the paved national road network. As a result of the improved fiscal situation and of external borrowing, transport expenditures evolved from about US$80 million per year at the beginning of the 1990s to an average of US$400 million annually over the period 1993-1999. Fiscal difficulties came back in 1999 with the negative impact of the El Niño phenomenon, combined with the effects of the Asian crisis. In 2001, the GoP gave priority to the social sectors by cutting down expenditures in other domains, in particular transport. The fiscal situation started to improve at the end of 2001. The 2002 budget then affected 40 percent of the proceeds from privatizations and concessions to road investments. As a result, US$170 million worth of road works were scheduled to be procured in 2002 but could only be partially financed, due to the suspension of the privatization process for the power enterprises Egasa and EGESUR in Arequipa.

Figure 7-6: Transport expenditures in Peru and other LAC countries

![Transport expenditures in Peru and other LAC countries](image)

Source: Calderón and Servén (2009).

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Historically, Peru has had one of the lowest levels of public investment in the region. Peru’s public investment in transport infrastructure represented 0.34 percent of GDP in 1981-1986 but only 0.09 percent 2001-2006. This drop has been compensated by a significant increase in private financing that represented only 0.02 percent of GDP in 1991-1996 but 0.28 percent in 2001-2006. However, the total investment (public and private) in transport in Peru in 2001-2006 (0.37 percent of GDP) remained, together with Mexico, the lowest rate in Latin America, far below Chile (1.69), Argentina (0.68), Colombia (0.67), and Brazil (0.41) (Calderón and Servén, 2009).

The investment program for 2007-2011 aims at accelerating investments. The Strategic and Institutional Plan of the MTC assigns PEN 13.5 billion\(^{36}\) (US$4.2 million) for transport investments for the period 2007-2011 (i.e. an average of US$844 million per year). In addition, an additional 1,800 km of road concessions could be awarded. This plan constitutes a significant increase of transport investment and an effort to limit volatility through a strategic planning of investments. As a result of public investments in transport but also in other sectors, total public capital investments could increase from 4 percent of GDP in 2008 to 6.6 percent in 2011.

Table 7-8: Budgeted resources in MTC’s strategic and institutional plan for 2007-2011

<table>
<thead>
<tr>
<th>Program (PEN million)</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land transport</td>
<td>1,864</td>
<td>2,392</td>
<td>2,709</td>
<td>3,071</td>
<td>3,218</td>
<td>13,254</td>
</tr>
<tr>
<td>Air transport</td>
<td>72</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>113</td>
</tr>
<tr>
<td>Sea and river transport</td>
<td>11</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>88</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,947</td>
<td>2,422</td>
<td>2,739</td>
<td>3,101</td>
<td>3,247</td>
<td>13,456</td>
</tr>
</tbody>
</table>

\(^{36}\) PEN: Peruvian Nuevo Sol
Spending in transport is expected to increase further with Peru’s stimulus package. The countercyclical stimulus package adopted by the GoP in response to the global crisis is expected to further the trend, although the Peruvian package is still in the lower range in the region, with US$3 billion or about 2.5 percent of GDP. In comparison, Argentina’s stimulus package amounts to 12.5 percent of GDP and the Brazilian package, 3.8 percent. Peru’s stimulus package plans to dedicate two-thirds of the resources on infrastructure and aims at doubling capital expenditures, compared to 2005. As a result, road improvement expenditures are increasing dramatically: Provías Nacional’s budget for national roads investment quadrupled between 2005 and 2009 to reach almost US$1.1 billion in 2009. The most important increase in this budget is observed in the category of larger infrastructure works (e.g., the IIRSA Sur road or Tren Eléctrico urban transport system).

**Figure 7-7: Evolution of national road expenditures**

Execution rate. The budget execution rate is high (75 to 90 percent) although it has been slightly decreasing recently, possibly due to some institutional limitations in absorbing the additional workload. Nevertheless, after only four months, 29 percent of the 2009 budget had already been executed by Provías Nacional, despite the doubling of budget resources compared to the previous year.

**Improving the efficiency of public expenditures**

Results-based budgeting pilot. The MTC has been one of the pilot ministries for results-based budgeting. This experience is too recent to be evaluated but is expected to produce important benefits in the medium to long term.

**Transport revenues**

*Transport still brings more fiscal resources than what is spent by the government in the sector.* Transport-related revenues come principally from gasoline taxes and other taxes, toll revenues, transport concessions, fines and other operating income from public enterprises. Most of these revenues are raised in the road sub-sector where they represented in 2003 PEN 3.75 billion (US$1.17 billion) or about 87 percent of the total transport-related revenues. In comparison, public expenditures in the entire transport sector ranged from PEN 1.5 – 2.55 billion between 1994 and 2003. Over the period 1994-2004, the
transport sector resulted in an annual net benefit for the Peruvian government ranging between PEN 0.63 and 2.83 billion (US$196 to 883 million).

MAIN CHALLENGES AND RECOMMENDATIONS

Strategic priority No. 1: Getting the full benefits of Peru’s stimulus package

The focus of Peru’s stimulus package on infrastructure, and in particular on transport, constitutes a unique opportunity to reduce the gap with benchmark countries and prepare the country for when global growth will resume. The doubling of capital expenditures compared to 2005 means that the transport sector in Peru will experience a massive “investment shock” that has the potential to deeply transform the country’s logistics performance.

In order for Peru’s stimulus package to produce its expected benefits though, there are a number of important conditions. The following recommendations would help address major existing bottlenecks in the sector and improve the stimulus package’s effectiveness in reaching its overall objective of strengthening Peru’s competitiveness and promoting inclusive growth.

Recommendation No. 1: complement the “mega-projects” focus of the package with an ambitious road asset management program (see also fourth Strategic Priority below). While more visible, new infrastructure investments generally have a lower economic relevance than ensuring that existing infrastructure are properly maintained. In addition to the “mega-projects” that are being implemented, the stimulus package should therefore dedicate resources to the rehabilitation and maintenance of existing roads and other transport infrastructure. Road maintenance is particularly important to ensure the sustainability of existing assets. It should be recalled that, over the past decade, the cumulated economic losses due to the lack of maintenance amount to a significant share of what Peru is now planning to invest in road improvement. Road maintenance is also the most labor-intensive of all infrastructure investments. A recent World Bank study has estimated that, albeit limited in scope, routine maintenance works can generate up to 500 jobs per US$1 million invested and can act as a safety net mechanism for the rural poor, through the use of specialized microenterprises.

Recommendation No. 2: invest in rural roads (see also third Strategic Priority below). Major infrastructures such as national roads play an important role in national mobility and in connecting the different regions of Peru. However, rural roads also play a fundamental role in promoting a more inclusive growth and in rebalancing Peru’s development. Though highly successful, Peru’s rural roads program has only achieved, in more than 15 years, rehabilitation and maintenance of a third of the total registered rural roads network, due to the lack of resources. Rural roads investments are also relatively inexpensive: the rehabilitation of all the remaining 30,000 km of rural roads that have not yet been improved would cost about a fourth of the revised cost of the IIRSA Sur corridor. Such an investment strategy would directly benefit the eight million Peruvians who are currently living in rural areas. Finally the institutional framework needed to implement a scaled-up rural roads program is already there: a large majority of provinces already have a Provincial Road Institute, and Provías Descentralizado has accumulated 15 years of experience in providing technical assistance to municipalities in implementing

their rural roads programs.

**Recommendation No. 3:** strengthen mechanisms aiming at improving the quality of infrastructure investments, particularly on public finance and safeguards issues. Peru’s ambitious counter-cyclical investment program has put a lot of emphasis on accelerating the execution of road works and concession activities. This is a dramatic change from the policies that were implemented only a few months before (i.e., reducing public investments to avoid a possible “over-heating” of the economy). While such acceleration is desirable, it should not lead to a weakening over existing mechanisms whose role is to ensure the quality of public investments. The experience of the IIRSA Sur has shown that when the normal investment cycle is excessively accelerated, this can lead to major difficulties (in particular unexpected contingent liabilities due to poor quality design studies). Environmental and social safeguards of such investments also need to be properly assessed. Finally, sound planning can be an effective way to prioritize investments with the highest impact. The government should strengthen these mechanisms that help improve the quality of infrastructure expenditures (planning, design studies, contingent liability evaluation, safeguards assessment, SNIP, etc.) and make them more efficient. The existing pilot on results-based budgeting launched by MTC in coordination with MEF could also be furthered.

**Recommendation No. 4:** make execution of public investments more agile and prevent the possible saturation of executing agencies. The execution of public investments in Peru is still highly complex and bureaucratic. While several of the steps are very important to protect the quality of expenditures, a deep reengineering of the investment cycle would help simplify and optimize execution. Institutional capacity also needs to be strengthened: an institution like Provías Nacional has seen a doubling of its investment budget in 2009 compared to the year before and a quadrupling since 2005, but staff and current expenditures have remained the same. While greater productivity can legitimately be expected, there is a significant risk that if nothing is done, this institution may soon reach its maximum absorptive capacity.

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**Strategic priority No. 2: Improving the logistics situation**

Peru has a strategic location for Asia-America trade. The airport and port hub of Callao, in addition to other ports, are well positioned in this regard, provided that efficiency gains allow them to compete. The high growth performance of Peru over the past five years, although it is now also affected by the global economic downturn, has dramatically increased the demand for transport services. In order to continue to grow, the mining sector – one of the main drivers of Peru’s growth, along with the tourism industry, will require roads in good condition as well as efficient ports and airports and multimodal integration. The existing infrastructure stock, as well as other efficiency ratios and Peru’s high logistics costs, suggest that the infrastructure sectors are not yet up to the demand increase, and that they could even become a liability to Peru’s competitiveness if the whole logistics performance is not significantly improved.

**Recommendation No. 5:** Streamline the logistics dimension into strategic planning for multimodal transport investments. Increased Peruvian exports will require looking at the improvement of the entire logistics chain before deciding on the construction of new infrastructure. In order to efficiently handle the increase in dry cargo exports (essentially minerals), the GoP is considering building new ports and possibly expanding its railway network. These investments should be thought of in an integrated manner in order to have a true impact on the improvement of the logistics chain. Several public and private port projects have been proposed in the current context of increased mining activity. An expansion of the railway network is also envisaged, in a context in which energy efficiency as well as limited environmental impact takes greater importance. A better coordination and planning of technical and regulatory designs is needed prior to such massive investments. In particular, greater synergies should be explored between mining projects themselves and between mining and non-mining projects, in order to generate greater economies of scale. Successful international experiences that could be of interest to
Peru’s decision makers include: Richards Bay (South Africa) and the “Maputo Corridor” between Mozambique and South Africa.

Recommendation No. 6: Update national road plans with a view to better identify key corridors that could become saturated in the short to medium term. The current economic growth and motorization increase may result in the saturation of some transport corridors. One of these corridors is the “Corredor Costa-Sierra-Central,” whose vehicle/capacity ratio is expected to reach 0.8 in 2023. Current planning instruments need to be revised to account for Peru’s recent growth and identify possible bottlenecks in the transport system. Early identification of such strategic investments would allow better planning ahead of design studies and comparisons of investment alternatives.

Strategic priority No. 3: Expanding rural access

Rural transport investments have been found to generate important benefits when they are prioritized by local stakeholders under a road planning methodology rewarding infrastructure that gives access to areas with higher growth potential. Over its 13 years of existence, the Peruvian rural roads program has rehabilitated about 15,000 km of rural roads, i.e., less than a third of the total registered rural roads network. This program has triggered important social benefits, such as improved access to education or health services, resulting in decreased child illnesses and increased school registration. An ex-post economic evaluation, performed at the end of the second phase (1996) on a randomized sample of rehabilitation works, found Economic Rate of Returns (ERR) of 31 percent, with a 14 discount rate, using the producer surplus approach, due in particular to greater productivity in the agricultural sector. In comparison, the “mega-project” IIRSA Sur was estimated to have an ERR of 24 percent, but with an 11 percent discount rate and based on the initial US$850 million investment cost.

Recommendation No. 7: Scale up the rural roads program so that at least half of the rural roads network is in good condition by 2015 and so that all district municipalities are linked by good-condition roads. Providing rural access is a relatively inexpensive public investment. The combination of gravel roads plus community-based routine maintenance has proven to be a low-cost but highly sustainable technical option for improving low-traffic rural roads. Although rehabilitation costs have increased since 2005 as a result of the construction boom and of constraints on the supply side, the rehabilitation of one kilometer of gravel road remains relatively cheap (US$15,000 to US$30,000) compared to the paving of that same road (between US$120,000 and US$300,000, depending on the technical standards). Rehabilitating the entire registered Peruvian road network would cost about US$1.4 billion, i.e., less than the updated 2,500 km IIRSA Sur project, for both social and economic impacts far greater. While the political demand for the IIRSA Sur might be greater from the southern regions than for rehabilitating rural roads, the social and economic impact of a massive “investment shock” focused on improving rural access would probably be greater for these regions. Slightly fewer than 9,000 km of rural roads would need to be rehabilitated so that half of the rural roads network could be considered in good condition. A third are already scheduled to be rehabilitated as part of the Decentralized Rural Transport project over the period 2006-2012. Budget resources would also have to be secured to ensure the sound maintenance of the rehabilitated network. While roads to be rehabilitated would have to be identified by local stakeholders through participatory road planning, a basic objective could be that all 1,812 district municipalities be accessible by a good-condition road. The MTC has already set an objective of ensuring access to all 194 provincial municipalities through paved roads.

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38 Source: Universidad del Pacifico (2008), Beneficios económicos de la carretera interoceánica
Strategic priority No. 4: Ensuring sound road asset management

Road asset management activities, and in particular maintenance, have the highest economic returns of all road investments. However, because they are less visible than larger-scale new infrastructure, they tend to receive less attention and fewer resources than these other types of investments. Peru has made significant progress in this area, in particular through the piloting of low-cost paving, the development of community-based routine maintenance activities through the constitution of microenterprises, and the contracting out of most maintenance activities. However, these initiatives still need to be streamlined or expanded. Other innovations (CREMA) could also help secure the long-term maintenance of selected national roads.

Recommendation No. 8: Continue piloting and scaling up the low-cost paving technologies being implemented under Proyecto Perú. By leaving open to private contractors the choice of proposing technological alternatives, Proyecto Perú has successfully piloted the use of low-cost-paving technologies. Such technologies are particularly relevant in lower-traffic national roads (such as the ones that were transferred as part of the recent road reclassification) and they could provide a cost-effective solution to increasing the proportion of paved roads in the total network (Peru currently ranks very low according to the density of paved roads). The scaling up of this pilot should therefore be envisaged. This will require formalizing the corresponding standards (in particular the geometrical characteristics of the improved roads so that road safety conditions are not affected by higher speeds).

Box 7-5: The experience of CREMA contracts in Brazil and Argentina

CREMA (Contracts of Rehabilitation and Maintenance) contracts bundle rehabilitation works together with five to 10 years of maintenance (periodic and routine). It is a results-based contract: the contractor is evaluated on the quality of the road, regardless of the inputs that are needed to upgrade and keep it in such conditions. Moreover, the contractor has the flexibility to determine which technology will allow minimization of the overall rehabilitation and maintenance costs (a “cheaper road” would require more maintenance but seeking to reduce too many maintenance needs would also require a much more expensive initial investment). Implementing CREMA contracts requires finding the right contractual arrangements but also changing the way the Ministry of Transport supervises the works.

As the CREMA system has been remarkably successful, particularly in improving the efficiency and public accountability of road maintenance expenditures, it is enjoying wide acceptance in the LAC region and elsewhere, as is seen with the introduction of similar programs in Chile, Brazil, Uruguay, and through World Bank programs in sub-Saharan Africa. Two countries in LAC have moved ahead quite significantly with a CREMA program and could offer important lessons for Peru:

- Argentina, emerging from the depths of unattended infrastructure backlogs in early 1990s, is now regarded as one of the highest performing countries in the region in road asset management. Since the early 1990s, through reform and technical assistance as well as financing from the Bank, Argentina has successfully introduced a CREMA program, and now has the most extensive experience and coverage (11,000km of network covered, with individual contracts of 100-300km).

The road contracts include rehabilitation and maintenance over a period spanning five years, as well as provisions for emergency works in the event of unforeseen events. Through CREMA, risks and responsibilities are transferred to the private sector (including requirements for compliance with environmental and social concerns). The roads are inspected regularly, contractor compliance assessed, and payments delivered. As the contractor is evaluated on the performance of the asset, the standards must be clearly defined in the contract, and must be measurable to allow for objective evaluation. Some examples of measurable performance indicators that contribute to user satisfaction, protection, and costs: roughness (vehicle operating costs); potholes/cracking/rutting (ride quality); surface friction – (safety); unobstructed drainage system (integrity of structure, safety); retro-reflexivity of road signs & markings (safety); removal of fixed objects at roadsides (safety), etc.
Recommendation No. 9: Pilot CREMA contracts on one or two sections of the non-concessioned paved national road network. CREMA contracts are now widely used by several LAC countries (including Argentina and Brazil) and have resulted in a significant improvement of road conditions. Provías Nacional should pilot such contracting arrangements, evaluate results, and eventually expand them. One important issue will be to determine how legal and normative constraints to longer-term rehabilitation and maintenance contracts (i.e., more than five years) could be lifted. While many Latin American countries face the same difficulty of having the national procurement law limiting the maximum duration of CREMA contracts to five years, Brazil is currently exploring piloting CREMA arrangements beyond 15 years, under the existing concession law. While such arrangement presents technical difficulties in defining criteria characterizing the state of the infrastructure at the end of the contractual period, they present the advantage of securing road conditions for a longer period of time and of bundling together several road improvement activities (e.g., three years of conservation and preparation of designs, two years of rehabilitation works, and 10 years of maintenance).

Recommendation No. 10: Initiate a study on performance indicators for maintenance and refine technical norms and programming so that maintenance is better aligned with the life cycle of roads. In order to further guide its policy decisions on CREMA contracts as well as other types of maintenance contracts, Provías Nacional should initiate a study—looking at the international experience—on possible performance indicators that could help the development of maintenance contracting by level of services. The programming of maintenance activity is also critical to the optimization of road asset management. In addition to establishing a permanent and efficient routine maintenance system, it is critical that periodic maintenance be also performed on a timely basis. Modeling tools for the life cycle of roads, such as HDM-4, as well as the establishment of a sound road maintenance monitoring and evaluation and a more precise definition of maintenance standards based on the different categories of roads could greatly help MTC optimize its road maintenance activities.

Recommendation No. 11: Fully phase out force account practices, with the only eventual exception of emergency maintenance. Over the past five years, the MTC has evolved from a situation where force account was the norm for road management to a situation where it has become the exception. The majority of the national road network is either maintained through concession arrangements or through

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39 Highway Design and Maintenance Standards Model, suited for the economic evaluation of road works
contracts. Regarding the subnational network, while Provías Departamental did have an extensive force account capacity, this was almost completely phased out when this institution was merged with Provías Rural to become Provías Descentralizado. The resulting entity is now assisting subnational governments with the management of their assets and encouraging them to contract out maintenance, in particular to microenterprises. However, a significant part of subnational governments are still using – or even reinforcing – their force account capacities. Provías Descentralizado is also still closing a few force account activities transferred by Provías Departamental. Finally, a clear policy still needs to be defined regarding the respective use of force account versus contracting out by Provías Nacional. In line with the evolution of recent years, the MTC should aim at fully phasing out force account practices, with the only possible exception of emergency maintenance. While emergency maintenance can also be contracted out to the private sector, it could be useful to retain some intervention capacity in case of certain emergency situations.

Recommendation No. 12: Secure funding for road maintenance at both the national and the subnational levels. Ensuring the effective maintenance of roads and bridges should remain a major priority when deciding on the allocation of budget resources for transport investments. Although maintenance activities are less visible than the construction of new roads, there is significant evidence that they have the highest returns on investments. Through road concessioning, innovations like the microenterprises for routine maintenance, or the CREMA contracts pilot, Peru is now ensuring that a significant share of its road network is adequately maintained. This share should be increased with greater budget resources allocated toward maintenance at both the national and the subnational levels. At the national level, the maintenance budget should in particular be protected from fiscal shocks that could arise from the global financial crisis or the impact of major transport investments (like the IIRSA Sur) on the MTC budget. If needed, an increase of toll tariffs could be envisaged to pay for maintenance, since Peruvian toll fees are generally below the regional average. Any revision to the current pricing policy of toll roads should reflect differences in damage to the infrastructure caused by the different categories of vehicles. For the subnational road network, greater incentives should be given to subnational governments for them to dedicate additional resources to road maintenance. The specific intergovernmental transfer established by MEF through the Supreme Decree No. 017-2006-MTC could also be expanded to other rural roads than the currently targeted 14,750 km, i.e., less than a third of the total rural roads network.

Strategic priority No. 5: Promoting road safety

Peru has one of the most deteriorated situations in terms of road safety in the region. If nothing is done, the expected increase in mobility driven by the growing demand for transport services is likely to aggravate the situation. An ambitious and comprehensive National Road Safety Plan has been prepared. However, Peru still lacks a strong institution that could lead this agenda. Inter-ministerial cooperation on this issue is weak, crash data are inaccurate, and recent policy measures have not yet produced the expected results.

Recommendation No. 13: Build a culture of safe road design and usage. A major thrust of the Peru National Road Safety Plan is the promotion of safe road usage practices through educational programs targeting student populations and massive campaigns targeting the general driver, pedestrian, and public transport user population at large. Indeed, over 50 percent of the crashes can be attributed to both driver and pedestrian behavior, indicating a need to revisit current licensing and regulating policies as well as to strengthen the educational and awareness raising efforts delivered thus far. In addition to emphasizing safe road use, the provision of safer road infrastructure is also targeted through the incorporation of programs such as road safety audits and adoption of standards that promote safe road design. Along with the educational and awareness campaigns, enforcement practices will need to be enhanced. The National Plan aims to provide better tools utilizing relevant technologies to appropriately equip the law
enforcement agencies so that they can more effectively carry out the task of enforcing traffic laws.

Recommendation No. 14: Implement a results-focused approach through enhanced monitoring and evaluation, in order to achieve the long-term objective of vehicle accident reduction. The current plan has established a target of reducing crashes by 30 percent over the five year period 2007 – 2011. International experience shows that a long-term vision, supported by institutional frameworks and requisite resources is the preferred approach to achieving improved road safety and minimizing the impacts due to loss of lives, health, and wealth. For example, in Spain, over a three-year period (1991-1994), the numbers of crash victims were reduced by 40 percent due to strong leadership. In France, efforts to improve road safety over the past three decades enabled considerable reductions in fatalities and injuries. Examples from Australia and New Zealand show that the appropriate policies can help achieve targets combined with sustained implementation efforts. The prime international example is that of Sweden, which not only has adopted “Vision Zero,” but is continuously revising its program so as to achieve the vision of zero deaths due to road crashes. In order to effectively monitor and evaluate the program, there will need to be a more efficient system for collecting, managing and analyzing crash data and providing feedback so as to adjust the program as needed. The results approach will also help address weaknesses, and mitigate risks of road safety by including a comprehensive analysis of the performance of the informal public transport sector. Private sector participation will be enhanced and encouraged, building upon the tenets of shared responsibility, targeting transport service providers as well as infrastructure providers/developers, and other stakeholders such as industries and insurance companies. An important consideration and focus of the government is decentralization, and this will be achieved through the creation of Regional Safety Agencies (regional, provincial governments, tapping into these potential funding sources and enabling the devolution of responsibilities).

Recommendation No. 15: Execute in 2009-2010 the investment program identified through the “iRAP” road safety assessments on at least 2,500 km of roads. Road safety assessments are currently being performed on 2,800 km of Peruvian roads as part of a pilot program. These assessments follow an international methodology named iRAP. They result in the classification of roads in five categories (as measured by a number of “stars”). Road improvement investments are also identified in order to upgrade dangerous road sections to higher categories by reducing “black spots.” It is recommended that these investments be executed in the two years following the assessment. The iRAP pilot could also be expanded to a greater proportion of the Peruvian road network.

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**Box 7-6: International Road Assessment Programme (iRAP)**

iRAP was formed in 2006 as an umbrella organization for EuroRAP, usRAP, and AusRAP and also to facilitate work in middle- and low-income countries. iRAP assesses roads all over the world and aims to significantly reduce road casualties by improving the safety of road infrastructure. In 2006 and 2007 four pilot studies in Malaysia, Chile, Costa Rica, and South Africa were undertaken and showed that road assessment is also helpful in developing countries. High-risk roads where large numbers are killed or seriously injured were inspected and affordable programs of safety engineering were identified. As the numbers of fatalities of vulnerable road users (like pedestrians and two-wheelers) are high among road deaths in these countries, iRAP focused on measures to improve road design

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40 Experience in high-income countries demonstrates that road deaths and injuries are preventable, and the potential benefits to low- and middle-income countries are huge. Preliminary estimates by the World Bank indicate that more than 2.5 million lives could be saved and 200 million injuries avoided if fatality rates per vehicle could be reduced by an additional 30 percent by 2020.
Recommendation No. 16: Design and implement a demonstrative “safe corridors” program. “Safe corridors” are specific road sections on which a combination of road safety measures should critically improve safety indicators (reduction of accidents, reduction of deaths from crashes). Possible measures include: (1) infrastructure improvements; (2) better enforcement of traffic and vehicle regulation (e.g., by increasing police presence or by doubling fines); (3) better response from emergency response mechanisms (greater concentration of ambulances and emergency vehicles, closer presence to hospitals); (4) lowered speed limits; and/or (5) increased information to road users. The international experience (e.g., in the United States) has demonstrated that such combinations of interventions have a significant impact on the occurrence and seriousness of crashes. On the other hand, they require active cooperation between the various institutions and agencies in charge. In Peru, a strengthened National Road Safety Council could serve such purpose. A “safe corridors” program could trigger quick wins in terms of impact that would facilitate the scaling up of an improved road safety culture in Peru. The MTC is envisaging launching a safe corridors program on two pilot roads, one concessioned and one administered by Provías Nacional.

Recommendation No. 17: Build a lead road safety institution, possibly articulated around the National Road Safety Council and its Executive Secretariat. Implementing the 2007-2011 National Safety Plan will require an effective lead agency to champion the ambitious objective of reducing accidents by 30 percent by 2011. The CNSV and its executive secretariat are currently leading this agenda. However, the limited resources available to these institutions are currently insufficient to take over these important responsibilities. The recent creation of the Superintendencia for Land Transport suggests that this new institution could also take over some of these responsibilities. A clear definition of which institution(s) will lead the road safety agenda in Peru is still needed. Once the institution(s) in charge are clarified, an aggressive institutional strengthening program will need to be designed and implemented and sufficient budget resources allocated for at least the coming five years, in order to credibly be able to achieve the desired objectives.

Strategic priority No. 6: Increasing port capacity and reducing costs in the port sector

Improving the performance of Peru’s port sector should be an important priority in efforts to improve the country’s logistics situation. The new container terminal in Callao will represent a significant improvement of the capacity and quality of port services in Peru. However, other private terminals will most likely be needed in order to match the demand for port services and to ensure competition. The demand for port services related to the handling of containers has increased dramatically and this growth is expected to resume, once the global economic downturn has been overcome. In 2007, Callao handled 1.1 million TEUs, compared to 1.25 million expected in 2008 and 1.5 million for 2010. The concession of “Muelle Sur” has been highly successful since the resulting capacity increase (totaling 0.85 million TEUs for the first phase and 1.3 million TEUs for the second one) should allow satisfying about half of the market demand once the second phase of the investment is completed. However, even with this second phase in operation, about 40 percent of the market demand still will have to be attended by ENAPU. The

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41 Acronym for Global Road Safety Facility

- 44 -
current quality of the port services provided by ENAPU is clearly below what is expected from DPW, the concessionaire of Muelle Sur, and it is unlikely that this service can be substantially improved in the near future since no major works will be initiated until DPW finishes its own. As a result, boats that have contracted their port services with DPW will have a substantially better competitive situation than the ones that contracted with ENAPU. Additional operators and investments will therefore be needed in order to increase capacity in proportion to the evolution of the demand.

Recommendation No. 18: Ensure better “port-city” integration, taking into account the rapid growth of Callao but also of other regional ports. Better “port-city” integration is needed in order to address the progressive saturation of terrestrial access in Callao. In many countries, the expansion of port capacity caused by increased maritime traffic is generating tensions between port and city developments. In the case of Callao, the current annual flow of about 1.2 million TEUs is generating an increasing congestion of neighboring access roads. The situation will become worse, considering mid-term projections with a doubling or tripling of the existing flow. The communication network between the maritime terminal and the immediate surroundings (the Gambetta Avenue area) is currently being improved. However, it can be expected that the traffic flows will also increase between the immediate port area and the rest of the Lima region. Thus, additional transit improvements must be realized on other regional transport infrastructure such as the Periférico Norte or the Ramiro Prialé Avenue. Port-city integration is also an issue for other secondary Peruvian ports such as Paita, Chimbote, and Ilo.

Recommendation No. 19: Launch a study to assess the best location for a new port to handle cargo and containers once Callao has become fully saturated. The decision to move the dry cargo terminal from the Callao area after 2011 is expected to bring significant benefits in terms of public health and traffic congestion for urban transport. However, such decision should also apply to any additional port capacity – including in terms of containers – that should be relocated outside of the city. Possible sites that could handle this increased capacity include Ventanilla (although this port still does not handle containers), Ancon, and Chancay. A study of cargo and container flows should help decide which location is best to host the increased capacity. It is worth noting that in the case of Ancon, the urban development around that site would also require an improvement of other transport infrastructure (roads, railways) so that freight can be more easily transported between the future port terminals and the areas of consumption and production.

Recommendation No. 20: Design and implement a reform program to raise the efficiency of ENAPU. Increased capacity and efficiency gains in the port sector could generate substantial savings. Over-costs generated by constrained capacity and inefficiencies from the Callao port have been estimated to an annual US$218 million. The construction of the new Muelle Sur terminal will improve the situation but will not be sufficient until additional ports are built or expanded. The annual global savings that could be generated by productivity gains (particularly in ENAPU), modernization, and capacity improvement could be equivalent to the investment cost of a new port terminal with the same capacity as Callao but more modern equipment, such as the acquisition of 46 Gantry cranes or the building of 10.8 km of wharves.

| Strategic priority No. 7: Clarifying the regulatory framework |

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42 Dubai Ports World (DP World)
Although complex, the existing regulatory framework still lacks a global strategy for transport regulation, and some regulatory instruments (e.g., RENAT) are outdated.

**Recommendation No. 21:** Fill regulatory gaps within a comprehensive strategy for transport regulation. Many regulatory instruments need to be revisited, starting with the RENAT. A comprehensive regulatory review could also be usefully initiated by the MTC.

**Recommendation No. 22:** Enforce tougher vehicle regulations to encourage the renewing of the fleet for passenger transport services. In order to improve road safety conditions, it is recommended that more stringent regulations of passenger transport services be designed and implemented. Among the measures to be considered, the limitation to a maximum of 15 years for passenger transport vehicles, the interdiction of importing certain modified second-hand vehicles, and the enforcement of periodic technical controls of vehicles would help continue the modernization of the Peruvian fleet. These measures could also be effectively complemented by the enforcement of periodic medical visits for drivers.

**Strategic priority No. 8: Strengthening institutions and promoting coordination and accountability**

The multiple Peruvian institutions in charge of designing or implementing transport policies are insufficiently coordinated. The government’s objective of accelerating investments in infrastructure is challenged by institutional weaknesses at various levels. New institutions (e.g., the Superintendencia of Land Transport) have been created but it is still unclear how responsibilities will be assigned.

**Recommendation No. 23:** clarify the role of the newly created Superintendencia and its relation with other areas of the MTC. Although the broad responsibilities of the new Superintendencia of Land Transport are already known, the specifics of how they will be operationalized are still lacking. The preparation of the secondary regulation (reglamento) is an opportunity to clarify how the new institution will operate. Proper coordination needs to be defined with other areas of the MTC: DGCT\(^{43}\) in particular, but also CNSV on road safety or Provías Nacional on infrastructure quality monitoring.

**Recommendation No. 24:** assign clearer responsibilities to the various Peruvian institutions in charge of PPPs in transport. The lessons of the IIRSA Sur highlight the potential negative consequences of a lack of coordination between the various actors involved in PPP: ProInversión, OSITRAN, MEF, MTC (Concession Unit, OGPP\(^{44}\), Provías Nacional). These institutions are currently not coordinating enough or are exceeding their normal responsibilities. A specific piece of legislation, or at least a Memorandum of Understanding, should be elaborated to clarify the respective roles of these institutions in the PPP project cycle.

**Recommendation No. 25:** the creation of a Consultative Commission for Transport could help improve coordination between sectors and transport modes. Such a commission should involve high-level civil servants but also academics and roads users.

**Strategic priority No. 9: Furthering the decentralization reforms**

\(^{43}\) Spanish acronym for Dirección General De Circulación Terrestre (Land Traffic General Direction)  
\(^{44}\) General Unit for Planning and Budget
Since 2002, Peru has launched an ambitious decentralization process, particularly in the transport sector. The three categories of roads (primary, secondary, and tertiary) are assigned to the three tiers of governments (national, regional, municipal). The decentralization process has produced positive results in some areas (e.g., rural roads) but important shortfalls are still observed (e.g., at the regional level). The increased resources available to subnational governments will not be spent efficiently if important institutional and capacity bottlenecks are not addressed.

Recommendation No. 26: Help establish full capacity provincial road institutes in all 194 Peruvian provinces by 2012. The Provincial Road Institutes (PRIs) have been highly successful in building true institutional capacity at the municipal level to ensure an efficient management of rural roads. No other institutional alternatives have been proposed and Peruvian mayors are highly satisfied with this model. By the end of 2008, 178 PRIs had been created (out of 194 Peruvian provinces) but only 38 of them had reached full operational capacity. Fully operational PRIs, like the Paruro PRI located in the Cusco region, are involved both in the planning and programming of rural roads interventions and in the contracting of rehabilitation and maintenance works to construction firms and microenterprises. Their role is fully acknowledged and endorsed by district and provincial mayors who supervise the PRIs’ activities through the Provincial Road Boards. Full capacity PRIs are also highly regarded by the MEF for their capacity to ensure a high quality of public expenditures in rural transport. Provías Descentralizado should intensify its institutional building activities so that all 194 Peruvian provinces have a full capacity PRI by 2012. MEF could also reward full-capacity PRIs by authorizing additional transfers and/or greater autonomy.

Recommendation No. 27: Tailor regional assistance programs and provide greater incentives for a more effective management of transport expenditures. Although there are a wide variety of situations, the decentralization of secondary roads at the regional levels has not yet produced its expected results. The institutional capacity of regional governments remains weak and is complicated by the existence of a duplicate institutional framework (Gerencia de Infraestructura and Direcciones Regionales de Transporte). Existing programs that provide technical and financial assistance to regional governments in the transport sector (e.g., MEF with FONIPREL, MTC with the Regional Transport Decentralization Program) need to be reformulated to provide better incentives for regions to perform and to customize this type of technical assistance. A more focused approach (increase financial support to the best-performing and technical assistance to the least-performing ones) could also be more effective.

Strategic priority No. 10: Promoting innovation, research, monitoring, and evaluation

There are still many areas of transport policies in Peru and elsewhere that require research and innovation. A systematic use of monitoring and evaluation as well as partnerships with Peruvian research and academic institutions could help establish and consolidate a learning process with MTC. Better informed decisions could be made, an important element in the context of the current acceleration of infrastructure spending.

Recommendation No. 28: More actively promote research and innovation in transport. Some areas of MTC are already partnering with academic institutions (e.g., Provías Nacional with a Peruvian university on the monitoring of a low-cost paving pilot). Such partnerships could be identified (e.g., by an education grant program helping graduate students write masters or PhD theses on transport-related topics).

Recommendation No. 29: Build a learning process informing policy decisions through the creation of a transport statistics unit within MTC. Although the MTC has over the past decade introduced a number of significant innovations in the management of its road network, particularly for rural roads, taking stock of successful experiences could be enhanced by a greater use of systematic monitoring and evaluation. The management of transport statistics within the Ministry is still relatively weak and the poor coordination...
with the Peruvian Institute of Statistics (INEI) reduces opportunities for effective knowledge management. It is recommended that a small transport statistics unit be established in MTC’s Planning and Budgeting Department. A “transport observatory” could also be useful to create, in partnership with Peruvian universities or schools of engineering.

**Recommendation No. 30: Strengthen MTC’s information systems.** The accuracy and reliability of information systems is critical to informing the planning process and to making informed decisions. Many of the basic information systems of MTC are either outdated or nonexistent. Several existing systems need to be modernized (e.g., GIS-based) or be made compatible between each others. The last road inventory was done in 2006 (on the 17,000 km of national roads before reclassification) and there is no regular monitoring of road conditions. Origin/destination surveys are also insufficiently used. Important information systems needing to be improved include: (i) the updating of the national road inventory following the recent reclassification of Peruvian roads and the development of a specific Geographic Information System (GIS); (ii) the updating and extension of the existing bridge asset management system; (iii) the improvement of the current road emergency system; (iv) the improvement of the current system for contract management and quality control for results-based contracting; (v) studies of road user charges and toll road systems; (vi) studies to improve the current weight control and hazardous material transportation systems; (vii) the design of information systems for inter-provincial passenger transport; (viii) the updating of the MTC’s GIS system in particular with the acquisition of a new mapping database; (ix) the development of information systems to monitor the performance of transport for external trade; (x) origin-destination surveys on major transport corridors that are key to the country’s logistics system; (xi) the updating of the monitoring instruments for social and environmental issues; and (xii) the constitution of a road crash database, among others.
CHAPTER 8 : SECTOR PERSPECTIVES: WATER AND SANITATION

OVERVIEW

General sector status

Low coverage levels with large disparities. Despite sustained periods of economic growth in Peru, the adoption of recent reforms in the water and sanitation sector, and some periods of intensive investments in the sector, water and sanitation service coverage in Peru still lags behind the regional coverage averages for the Latin America and Caribbean (LAC) region. According to the latest report by the Joint Monitoring Program on Millennium Development Goals (World Health Organization and UNICEF), access to improved water source in Peru is slightly less than in poorer neighboring Bolivia. As in most countries in the region, there are large coverage disparities between urban and rural areas, geographical regions (Coastal, Andean, and Rain Forest areas), and socioeconomic characteristics of the population. Within the urban population most of those without access to water and sanitation services are located in small urban centers or in peri-urban areas. In rural areas, where access is lower, those located in the most remote and dispersed areas have a larger coverage gap than those living in concentrated rural communities.

Figure 8-1: Water and sanitation coverage (broad definition) in selected LAC countries


Improve the quality of investments and increase the resources available to expand access to services and improve its quality. The average investments in water and sanitation services in Peru is similar to other middle income countries in the region, like Argentina and Colombia, however coverage rates are much lower in Peru. This situation highlights the need for not only focusing on increasing the amount of resources available to the sector, but on improving the quality of the investments. It is also important to focus on improving the maintenance of the infrastructure so that new investments are really contributing to a sustained increase in access to water and sanitation services. Many of the resources allocated to the sector in Peru are used for the rehabilitation of infrastructure that deteriorates soon after construction,
especially in small towns and rural areas. It is known that in the absence of adequate operation and maintenance sector investments deteriorate and are not able to reach their original design goals. The current administration has given high priority to the water and sanitation sector, initially focusing on allocating a large amount of resources to increase sector coverage without sufficient consideration to the management of the systems. The Vice Ministry of Construction and Sanitation has recently adopted measures to improve the quality of investments, which is an important first step; however there is still a long way to go to ensuring the sustainability of sector investments.

Figure 8-2: Annual investment per capita in water supply and sanitation

![Annual investment per capita in water supply and sanitation](image)


Given the low access to sanitation services, only a small proportion of wastewater is adequately disposed, causing significant environmental damage: 100,000 cubic meters of untreated water are released daily into surface waters, and 535,000 cubic meters are discharged directly to the sea. Only 392 municipalities report some level of wastewater treatment, while 1,236 municipalities do not have any wastewater treatment installations. In urban areas where water and sanitation services are administered by EPSs, only 29 percent of the wastewater generated by the population is treated. The service areas of SEDAPAL and the large EPSs generate 79 percent of the total volume of wastewater generated in the country (about 855,000 cubic meters per day). No wastewater treatment is provided in eight regions. However, in five regions, the wastewater of more than 80 percent of the population served by EPS is

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45 Ecuador: only investment at the municipal level is included; Mexico: only investment in urban areas is included; Peru: possible investments at the municipal level are not included; Uruguay: the data only cover expenditure of the national utility Obras Sanitarias de la Nación.
Sources: Argentina: Budget of the Dirección Nacional de Inversión Pública, estimation based on extrapolation of Aguas Argentina’s investments; Colombia: Ministry of Environment, Housing and Territorial Development, Presupuesto General de la Nación, public hearings, economy modernization program, Plan Pacífico program, resources which were invested through the Fondo Nacional de Regalías, transfers established by Law 715 of 2001, SSPD (regulatory agency), private utilities were directly contacted, survey on investment climate (2002-2003); Costa Rica: Contraloría General de la República; Honduras: Ministry of finance; Mexico: Comisión Nacional del Agua (CONAGUA); Nicaragua: Unidad de Inversiones Públicas; Peru: Ministry of Housing, Construction, and Sanitation; Uruguay: Obras Sanitarias de la Nación.
46 Empresa Prestadora de Servicios de Saneamiento (Service Utility)
47 Spanish acronym for Servicio de Agua Potable y Alcantarillado de Lima (drinkable water and sewage services in Lima): it is the most important State-Owned Enterprise in the water sector, and operates in the Lima region.
treated. However, these figures do not imply that the treatment processes, the quality of operation of the plants, or the quality of the treated effluents is adequate. In fact, the processes are not always adequate and operation is deficient. It is evident that wastewater treatment in the country is a problem: coverage is low and the existing plants are inadequately operated. This stems from lack of financing, overly stringent effluent standards and inadequate institutional capacity.

The challenge of improving the performance of service providers at all levels. Even in urban areas with services provided by a water and sanitation utility (EPS), continuity of drinking water service is very low, with only two small utilities providing water 24 hours a day. The national average of 18 hours/day for the 50 EPSs in Peru, which provide services to the largest urban centers in the country, is considerably lower than that of Colombia’s 20 hours/day, as Colombia’s average includes all service providers, including more than 2,000 small towns. Large urban centers in Colombia, like Bogotá and Medellín, have an average of 24 hours of service, while Lima has only 21. The average continuity of water service provision in large and medium EPSs is an unacceptably low 15 hours/day, and in small EPSs 16 hours per day, which was the national average in Colombia in 1993. The unaccounted-for water average is high at the national level: 42 percent. But it is even more important in the EPS segment. Losses are high, and therefore the levels of production of water are also very above the regional average. It is of paramount importance to develop policies to promote efficiency among the utility segment, even more so in a country with high vulnerability to climate change; the most important adaptation measure in the water and sanitation sector is the efficient and rational use of water resources.

Service quality is worst in about 500 districts where water and sanitation services are mostly operated directly by the municipalities. In the absence of a specialized operator, services are provided by employees of the mayor’s office, usually by the department of public works, lacking the knowledge for the adequate operation and maintenance of the infrastructure, and with high political rotation of staff. The absence of a separate account makes it hard to determine actual costs, and thus tariffs are usually set according to political criteria, below the costs of operation and maintenance, with the consequence of substandard services and deterioration of infrastructure. In the absence of metering, consumption is usually high; the historic response has been increasing water production rather than rationalizing the demand, controlling losses and improving the management of the water and sanitation services. The VMCS has implemented some pilots focusing on improving management of services, with the use of a specialized operator, strong community participation, and in partnership with the local government, with much success. It is important to complement investments in infrastructure with capacity building activities and focusing on management of the systems.

In rural areas where water and sanitation coverage remains low, increasing the amount of resources for investment will not be enough to guarantee long-term sustainability of the services. Sector investments in rural areas need to provide adequate levels of service, according to the capacity of the community of operating and maintaining the system, following a demand responsive approach, and complemented with community participation, sanitary and environmental education, adequate mechanisms for operation and maintenance, and cost recovering rates to guarantee at a minimum the operation and maintenance of the system.

The VMCS needs to develop sector policies to promote efficient service delivery and transparent

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48 Source: SUNASS, Informe técnico del ranking de las empresas prestadoras a nivel nacional (2007)
49 Source: Comisión Nacional de Regulación de Servicios de Acueducto, Alcantarillado y Aseo (CRA), 2009. The Information is for 2007
50 Vice Ministry of Construction and Sanitation
allocation of resources. The Vice Ministry of Construction and Sanitation, the sector’s leading agency, urgently needs to develop consistent sector policies to promote cost-efficient and sustainable services. In a country with Peru’s level of development, the nonexistence of consistent financial policies for urban and rural areas is unacceptable. Smaller countries like Paraguay and others comparable to Peru, like Colombia, have been following consistent financial policies that allow different sources of investment to be applied with the same conditions and eligibility criteria, putting the government in the driver’s seat. In Peru, programs financed by different sources are being implemented through the same executing unit, PAPT\textsuperscript{51}, all with conflicting criteria, for example PRONASAR\textsuperscript{52} requires upfront contributions and co-financing of local governments and the complementary software investments while others must provide direct investments for construction of infrastructure. The central government provides 50 percent of total investments in the sector; in the decentralized environment, financial policies and transparent mechanisms to allocate resources could be efficient tools to improve service quality and financial performance.

The decentralization process is still incomplete and has been slow. Even though Peru has adopted a process of decentralization at the national level and the water and sanitation sector is not an exception, the sector remains highly centralized. The process of decentralization has been slow, with the central government still controlling half of the sector investments, and even though some functions at the ministerial level have been decentralized to the Regional Directorates of Housing and Sanitation, most lack the qualified staff and physical resources to perform their tasks as expected. Technical assistance and capacity-building activities should be promoted from the central government to strengthen the decentralization process.

SEDAPAL, the most important service provider, is under the responsibility of the central government. The central government, through SEDAPAL, provides water and sanitation services to 30 percent of the population in the country, a role that is not consistent with the responsibilities of the policymaking organization ente rector, as it creates what could be perceived as conflict of interest, favoring SEDAPAL over other EPSs. Currently, more than half of central government resources for investments in the water and sanitation sector are allocated to SEDAPAL; three out of four private sector participation schemes in the sector under implementation or preparation by ProInversión are for Lima, and most of the external credit resources in the pipeline for the sector will be allocated to SEDAPAL, with limited resources available to other EPSs, small municipalities, or rural areas.

There is a need to strengthen SUNASS\textsuperscript{53} to effectively regulate service providers, enforcing and controlling the compliance with standards, providing incentives to foster efficiency and to provide sustainable services to the population. Given the level of development reached by SUNASS, in terms of developing regulatory instruments, it is now the time to enforce compliance with regulations and to have a more proactive role in ensuring adequate service provisions to the population. Many EPSs are in a difficult financial situation, providing substandard levels of service; the regulatory agency therefore needs to apply the tools to improve that situation or take action to develop other management models (public, private, or mixed), ensuring an efficient and reliable provision of services for the population. In the revision of the optimized master plans, SUNASS should require the adoption of adaptation measures to climate change, initially at least to those EPSs in sensitive and vulnerable watersheds.

It is of paramount importance that EPSs and other water and sanitation service providers and users start

\footnotesize{51} Programa Agua Para Todos (Water for All program)
\footnotesize{52} National Rural Water and Sanitation Program
\footnotesize{53} Spanish acronym for Superintendencia Nacional de Servicios de Saneamiento (National Superintendence of Sanitation Services)
preparing for the impacts of climate change, which are expected to be substantial in the water and sanitation sector in Peru. Given the importance of glaciers and moorlands to the availability of water sources in the country’s water supply, hydropower and irrigation systems, the sector needs to adopt a more proactive attitude, incorporating adaptation measures in master plans and other planning tools. No water service provision in Peru will be sustainable in the absence of a strategy to adapt to the adverse impacts of climate change. The first adaptation measure in the sector should be the efficient use of water resources, including supply-driven measures like reduction of losses and education campaigns on rational use of water.

SECTOR STRUCTURE AND OWNERSHIP OF ASSETS

The provision of water and sanitation services is decentralized to municipalities. Since 1990, the responsibility for water and sanitation service provision has been decentralized to subnational governments (district or provincial municipalities). Local municipalities received the ownership of the Water Supply and Sanitation (WS&S) infrastructure and were mandated to create urban water utilities as autonomous ring-fenced corporations under private company law. The only exception is the service provision in Lima which was never transferred to the local government but remains under the responsibility of the central government, which retained the ownership of the infrastructure and created SEDAPAL as a public utility operating under private law. Although the regional governments do not have direct responsibilities in the sector, they often provide support (financial and technical) to service providers.

Box 8-1: Peruvian water utilities ownership in practice

SEDAPAL (Lima) - Total asset base of about US$1.8 billion and total liabilities of US$0.6 billion. One hundred percent of equity is owned by the central government through FONAFE, a National Public Holding Company under the Ministry of Finance created in 1999. FONAFE appoints the board of directors of SEDAPAL, upon proposal of the Ministry of Housing, Construction, and Sanitation. SEDAPAL’s Chief Executive Officer – the Executive President of the Board of Directors – reports to FONAFE.

SEDAPAR (Arequipa) - Total asset base of about US$106 million and total liabilities of US$38 million. Equity is owned by eight provincial and 25 district municipalities in the Arequipa Region. Distribution of shares is proportional to the value of infrastructure in each municipal jurisdiction. From an operational perspective, the Chief Executive Officer – SEDAPAR’s General Manager – reports to the Board of Directors. The Board of Directors is appointed by General Shareholders’ Assembly.


Until recently, the Board of Directors (BoD) of the EPSs had representatives from local governments.

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55 Law 26338 is known as WS&S General Water and Sanitation Law (Ley General de Servicios de Saneamiento) in this document.

56 Decree-Law No. 25491, which merges the Ministry of Housing and Construction with the Ministry of Transport, with the exception of SEDAPAL that is transferred to the Ministry of Presidency.

57 Acronym for United Nations Secretary General’s Advisory Board on Water & Sanitation.
only. This governance rule soon degenerated into political cronyism and management instability, as the Chief Executive Officer tended to be appointed by the largest local government (usually the provincial capital) and changed every three years, preventing most EPSs from developing good corporate governance. The law has recently been amended and the EPSs now have five seats: two for local governments, one for the regional government, one for professional associations, and one for the local Chamber of Commerce.

The organization of the provision of water supply and sanitation services varies across the urban spectrum. The Peruvian water and sanitation sector distinguishes between rural areas (up to 2,000 people) and urban areas (more than 2,000 people). Areas with a population of between 2,001 and 15,000 people are considered “small towns.” In urban areas, services are generally either provided by water and sanitation utilities (EPSs), or directly by the municipalities themselves, especially in the smaller areas. Small-scale service providers or microenterprises (“specialized operators”) have been created in recent years to improve services in small towns. The water and sanitation utilities serving areas with a population between 15,000 and 40,000 people are called small sanitation utilities (Pequeñas Empresas de Saneamiento, PES). 58

EPSs provide services to most cities. A large proportion of water and sanitation services are managed by EPS. There are 50 EPSs in Peru, ranging from small ones (1,000 to 10,000 connections) to SEDAPAL, which is the biggest utility in the country serving more than one million connections. The water and sanitation needs of 303 districts, with a population totaling 17.2 million, are covered under such arrangements. However, the percentage of urban population with access to water and sanitation services provided by an EPS ranges from 42 percent (Ucayali) to 97.3 percent (Tacna).

<table>
<thead>
<tr>
<th>Category</th>
<th>No. Providers</th>
<th>Total connections</th>
<th>No. districts</th>
<th>Population with access</th>
<th>% Total population</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEDAPAL</td>
<td>1</td>
<td>&gt;1,000,000</td>
<td>45</td>
<td>7,975,000</td>
<td>29</td>
</tr>
<tr>
<td>Large EPS</td>
<td>9</td>
<td>40,000-200,000</td>
<td>130</td>
<td>5,444,000</td>
<td>20</td>
</tr>
<tr>
<td>Med. EPS</td>
<td>23</td>
<td>10,000-40,000</td>
<td>91</td>
<td>3,004,000</td>
<td>11</td>
</tr>
<tr>
<td>Small EPS</td>
<td>17</td>
<td>1,000-10,000</td>
<td>37</td>
<td>705,000</td>
<td>3</td>
</tr>
<tr>
<td>Others</td>
<td>-</td>
<td>-</td>
<td>490</td>
<td>2,477,000</td>
<td>9</td>
</tr>
<tr>
<td>TOTAL</td>
<td>50</td>
<td>793</td>
<td></td>
<td>19,643,000</td>
<td>71</td>
</tr>
</tbody>
</table>

Source: Adapted from Plan Nacional de Saneamiento 2005-2015; Indicadores de gestión, SUNASS, 2007.

Some municipalities directly manage the provision of services. Although more than 87 percent of the urban population in Peru live in cities where the provision of water and sanitation services fall under the responsibility of an EPS, there are 490 urban districts with a total population of around 2.5 million people in which the provision of those services is directly managed by the municipality.

Communal organizations are responsible for service provision in rural areas. In rural areas, water and

58 The Supreme Decree 031-2009 from November 29, 2008, established a new definition for small towns (populated centers between 2,001 and 15,000 people). It also introduced the concept of Small Sanitation Companies (Pequeñas Empresas de Saneamiento, PES) and a new classification for the EPS. According to the decree, the companies that serve between 15,001 and 40,000 people are considered PES. The EPSs are subdivided into large EPSs (serving populations over 60,000), and small EPSs (serving populations between 40,001 and 60,000). Like EPSs, the PESs will be regulated by SUNASS. The adjustment of the EPSs to the new scenario will be gradual. Until the end of 2009, SUNASS should elaborate a regulatory framework for PESs, which will be applied to all PESs no longer considered EPSs.
sanitation services of the country’s 844 rural districts are managed by community-based organizations (Junta Administradoras de Servicios de Saneamiento, JASS). The rural population in Peru is highly dispersed, as 70 percent live in areas with fewer than 500 people. There are 76,779 populated areas in Peru, of which more than half have fewer than 50 people.

**Table 8-2: Peru’s rural population (2004)**

<table>
<thead>
<tr>
<th>Size of populated areas</th>
<th>Total Population</th>
<th>Number of populated areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inhabitants</td>
<td>%</td>
</tr>
<tr>
<td>2,000 – 1,000</td>
<td>843,600</td>
<td>11.1</td>
</tr>
<tr>
<td>999 – 500</td>
<td>1,452,200</td>
<td>19.2</td>
</tr>
<tr>
<td>499 – 200</td>
<td>2,698,000</td>
<td>35.5</td>
</tr>
<tr>
<td>199 – 50</td>
<td>2,029,200</td>
<td>26.7</td>
</tr>
<tr>
<td>&lt; 50</td>
<td>570,000</td>
<td>7.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>7,593,000</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: SUNASS

**COVERAGE, QUALITY, AND EFFICIENCY**

**Coverage**

*In Peru, access to water supply and sanitation services is highly determined by the level of urbanization.* In 2004, 76 percent of the Peruvian population had access to drinking water and 57 percent to sanitation services. Coverage is significantly correlated to the size and type of service providers: in Lima, where services are managed by the largest EPS (SEDAPAL), access to drinking water reached 85.5 percent in 2007, whereas 81.2 of the population had access to sanitation. In smaller cities, where services are managed by small EPSs, rates of access to drinking water and sanitation in 2007 were 82.3 and 67.3 percent, respectively. Among urban areas, the lowest coverage is observed in cities where services are directly administered by municipalities: in 2004, only 60 percent of the 2.5 million Peruvians living in these cities had access to drinking water and only 33 percent to sanitation.

**Table 8-3: Water and sanitation services coverage**

<table>
<thead>
<tr>
<th>Type of area and type service of service provider</th>
<th>2004</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total population (million)</td>
<td>Water coverage (percent)</td>
</tr>
<tr>
<td>URBAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEDAPAL</td>
<td>8.0</td>
<td>89</td>
</tr>
<tr>
<td>Large EPS</td>
<td>5.4</td>
<td>82</td>
</tr>
<tr>
<td>Mid-size EPS</td>
<td>3.0</td>
<td>79</td>
</tr>
<tr>
<td>Small EPS</td>
<td>0.7</td>
<td>71</td>
</tr>
<tr>
<td>Municipalities</td>
<td>2.5</td>
<td>60</td>
</tr>
<tr>
<td>RURAL</td>
<td>7.9</td>
<td>62</td>
</tr>
<tr>
<td>Total</td>
<td>27.5</td>
<td>76</td>
</tr>
</tbody>
</table>

As in most countries in the region, rural coverage is considerably lower than in urban areas. Coverage figures in rural areas are only comparable to those in small municipalities; of the 7.9 million Peruvians living in rural areas, only 62 percent had access to drinking water and 30 percent to sanitation services in 2004. The rural population can be classified into three groups according to population density: larger villages between 500 and 2,000 inhabitants; villages with populations between 200 and 500 inhabitants; and smaller villages and dispersed populations with fewer than 200 inhabitants. Again it is found that in smaller villages, access to water and sanitation services is less than half the access in larger towns.

Table 8-4: Access to water and sanitation in rural areas (2000)

<table>
<thead>
<tr>
<th>Population (inhabitants)</th>
<th>Population distribution (percent)</th>
<th>Population with access (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Water</td>
</tr>
<tr>
<td>0 – 200</td>
<td>31.1</td>
<td>44</td>
</tr>
<tr>
<td>201 – 500</td>
<td>35.7</td>
<td>60</td>
</tr>
<tr>
<td>501 - 2000</td>
<td>33.2</td>
<td>82</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>62</td>
</tr>
</tbody>
</table>

Source: Lampoglia, T.

In urban areas, water coverage has increased considerably in recent years but that is not the case of sanitation. In urban areas where water and sanitation services are administered by EPS, the coverage increased between 1996 and 2007 from 74 to 84 percent for water and from 72 to 76 percent for sanitation. However, the increase occurred before 2003 and since then the coverage has been constant, with investments only sufficient to cover the population’s growth, without effectively increasing coverage. Despite having the lowest coverage in absolute values among all EPSs, it is the small and medium EPSs that present the largest increase in water and sanitation coverage during the last 10 years, as can be seen in Figure 8-3.

Figure 8-3: Water coverage evolution in areas under EPS management

Source: Based on SUNASS, Indicadores de Gestión (2007).

Figure 8-4: Sewerage coverage evolution in areas under EPS management
Despite recent improvements, rural access to water and sanitation services is still low, particularly in sanitation. In rural areas, the coverage for drinking water increased from 22.3 to 62 percent between 1988 and 2004. During the same period, the coverage for sanitation increased from 6.0 to 30.4 percent. Those were significant increases; however, the situation is still critical if the target was to reach 75 percent coverage. The largest deficit of water services is observed in low-density rural areas (populated areas of fewer than 500 people), which are the most remote and costly to serve, due in part to elevated logistic costs, in part to the low density of the areas.

**Figure 8-5:** Access to water services (public connection) and urban population by department

Access to water and sanitation services are highly related to the macro-region. Access to water and
sanitation services is not only significantly correlated to the degree of urbanization but to the geographical macro-region. Strong disparities are observed among the three Peruvian macro-regions: Costa (coastal region), Sierra (Andes), and Selva (rain forest). All departments where more than half of the population lives in rural areas have water service coverage of below 60 percent (compared to a national average of 76 percent in 2004). Seven departments have water service coverage below 50 percent, all of which are either located in the Sierra or Selva macro-regions: Puno, Huánuco, Amazonas, Loreto, Madre de Dios, Pasco, and Huancavelica. A similar pattern is observed for sanitation, with eight regions, all from the Sierra or Selva, having sanitation coverage of below 50 percent in 2006: Apurimac, Ayacucho, Puno, Huánuco, Cusco, Pasco, Madre de Dios, and Huancavelica.

Figure 8-6: Access to sanitation services (public connection) and urban population by department


Social disparities in access to improved services follow the same pattern as the regional disparities, with most of the discrepancies being dominated by the difference in access to those services between urban and rural areas. At the national level, only 45 percent of the poor have access to a water connection, compared to 78 percent for the non-poor. This proportion drops to only 28 percent in rural areas (41 percent for the non-poor). Most of the rural poor get their water from natural sources (rivers, springs), requiring water to be transported through different means, sometimes for long distances.

Figure 8-7: Water sources for poor and non-poor (2006)
Despite its proximity to large urban centers, the specific situation of poor peri-urban areas is the main coverage challenge for the EPSs. It is estimated that about 7.7 million Peruvians live in poor areas in the immediate periphery of cities. More than a third of these marginalized urban areas (Barrios Urbanos Marginales, BUMs) are located around Lima. Despite their proximity to highly equipped urban centers, only 53 percent of the population in these areas had access to drinking water in 2004, and 35.6 percent to sanitation, far below the average coverage observed in urban areas.

Table 8-5: Situation of peri-urban areas, national level

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>UNIT</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population in Marginal Urban Settlements (BUM)</td>
<td>Thousand hab.</td>
<td>7,717</td>
</tr>
<tr>
<td>Number of BUMs</td>
<td>Number</td>
<td>7,419</td>
</tr>
<tr>
<td>National distribution of BUMs</td>
<td>%</td>
<td>37</td>
</tr>
<tr>
<td>Lima Metropolitan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest of the country</td>
<td>%</td>
<td>63</td>
</tr>
<tr>
<td>Distribution of BUMs population</td>
<td>Thousand hab.</td>
<td>2,817</td>
</tr>
<tr>
<td>Lima Metropolitan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rest of the country</td>
<td></td>
<td>4,900</td>
</tr>
<tr>
<td>Basic services</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Household water connection</td>
<td>%</td>
<td>41</td>
</tr>
<tr>
<td>Water kiosk access</td>
<td>%</td>
<td>12</td>
</tr>
<tr>
<td>Sewerage connection</td>
<td>%</td>
<td>36</td>
</tr>
<tr>
<td>Public lighting</td>
<td>%</td>
<td>65</td>
</tr>
<tr>
<td>Household lighting</td>
<td>%</td>
<td>65</td>
</tr>
</tbody>
</table>


Figure 8-8: Access to drinking water in peri-urban areas
Most of the urban population without access to water and sanitation services lives in peri-urban areas. Comparing the coverage deficit in urban areas of Peru and the access to water and sewerage services in peri-urban areas, it is estimated that 96 percent of the urban population lack access to drinking water and 85 percent of those lacking access to sanitation services live in peri-urban areas. In many instances, these settlements have specific physical characteristics (such as being located either in steep slopes or in flood-prone areas) that require the use of adequate technologies and special attention to environmental issues, as can be seen in Table 8-6:

<table>
<thead>
<tr>
<th>Factor</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landslide risks</td>
<td>19.2%</td>
</tr>
<tr>
<td>Flood risks</td>
<td>21.2%</td>
</tr>
<tr>
<td>High slopes</td>
<td>26.4%</td>
</tr>
<tr>
<td>Close to cliffs/precipices</td>
<td>13.7%</td>
</tr>
<tr>
<td>Close to landfills/stagnant water</td>
<td>42.6%</td>
</tr>
</tbody>
</table>

Source: Based on data provided by Viceministerio de Construcción y Saneamiento (2007).

Service quality
Service continuity is a major issue both in urban and rural areas. According to a 2005 survey carried out in 1,628 municipalities, about half lack continuous access to water services. In 7.7 percent of the municipalities, access to water services was less than 11 hours a day. This problem is present regardless of whether municipalities are located in rural or urban areas. In 2007, the average amount of hours of service per day in urban areas served by EPSs was 17.8 hours, and 16 out of 50 did not provide access for more than 12 hours a day, with only 12 providing more than 20 hours per day.

<table>
<thead>
<tr>
<th>Hours per day with access to water services</th>
<th>Proportion of municipalities (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous service</td>
<td>51.8</td>
</tr>
<tr>
<td>More than 18 hours a day</td>
<td>26.1</td>
</tr>
<tr>
<td>Between 12 and 18 hours a day</td>
<td>14.4</td>
</tr>
<tr>
<td>Fewer than 12 hours a day</td>
<td>7.7</td>
</tr>
</tbody>
</table>


Water quality. In urban areas where water services are administered by EPS, the operators control various parameters of water quality (turbidity, disinfection). A quality monitoring framework is prepared by the national water and sanitation sector regulatory agency, the National Superintendence of Sanitation Services (SUNASS) for each EPS, depending on existing capacity. The quality of water generally complies with national norms. This is the result of important reforms initiated by SUNASS beginning in the late 1990s, in coordination with the Ministry of Health and the support of the international community. SUNASS monitors the quality of water for each EPS. However, in smaller urban areas where services are provided directly by the municipalities, as well as in rural areas, water quality often does not comply with the national standards or is just not monitored. According to the Vice Ministry of Sanitation\(^{60}\), it is estimated that 59 percent of rural water systems either have no disinfection system, or else one that is not operational, generally due to difficulties in acquiring disinfectants.

Operating performance

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\(^{59}\) Spanish acronym for *Registro Nacional de Municipalidades* (National Register of Municipalities)

\(^{60}\) Plan Nacional de Saneamiento 2006-2015
Access to safe water, mostly through piped networks and household connections, significantly improved during 1996-2007. According to SUNASS indicators, access to safe water in the EPS service areas increased from 71 percent in 1996 to 82 percent by 2007; and from 74 percent to 84 percent in the case of SEDAPAL. However, out of an urban population of 17.1 million people, there are at present about 3.1 million without access to piped water: 1.8 million in the EPS service areas and 1.3 million in SEDAPAL’s. Looking forward, and with respect to the 3.1 million people lacking access to safe water, it should be noted that the urban population is projected to increase by 3.8 million over the next 10 years.

Operating performance measured by productive efficiency (i.e., number of cubic meters of potable water produced for each cubic meter billed to customers, or \(\text{m}^3/\text{m}^3\text{ billed m}^3\)) is poor. It has not changed over the period of analysis in SEDAPAL’s case and remained at 1.58 \(\text{m}^3/\text{m}^3\text{ billed m}^3\); it has worsened in other EPSs from 1.72 \(\text{m}^3/\text{m}^3\) in 1996 up to 1.91 \(\text{m}^3/\text{m}^3\) in 2007. From international experience, well managed water utilities produce between 1.05 \(\text{m}^3/\text{m}^3\text{ billed m}^3\) (Public Utility Board, Singapore) and 1.33 \(\text{m}^3/\text{m}^3\text{ billed m}^3\) (EMOS, Chile, before 1998 privatization). Had SEDAPAL improved its \(\text{m}^3/\text{m}^3\text{ billed m}^3\) from 1.58 to 1.31, it would have generated about 213,000 \(\text{m}^3/\text{day}\) of water, enough for almost 1 million persons and 385,000 \(\text{m}^3/\text{day}\) in the case of EPSs. In terms of cost per cubic meter of water billed to customers, operating performance deteriorated in the case of SEDAPAL; its costs went from about US$0.33/ \(\text{m}^3\) in 1996 up to about US$0.44/ \(\text{m}^3\) in 2007. EPS costs remained the same at US$0.40/ \(\text{m}^3\). In local currency, the cost of \(\text{m}^3\) water billed increased 79 percent for SEDAPAL and 33 percent for EPS.

Operating performance measured by number of staff members per thousand connections has improved in the case of EPSs, from 5.65 in 1997 down to 3.46 in 2007; in SEDAPAL it worsened, going from 1.61 up to 2.45 in the same period. But in relation to water billed per staff member, SEDAPAL still performs better than EPS, as it billed 144,000 \(\text{m}^3/\text{staff member}\) compared with other utilities that billed 66,000 \(\text{m}^3/\text{staff member}\) during 2007. However, both SEDAPAL and EPS perform poorly compared with EMOS’ achievement (232,000 \(\text{m}^3/\text{staff member}\)) in 1998, before it was privatized.

Operating efficiency measured by quality of service as expressed by the number of hours of service per day is poor in the case of EPSs including SEDAPAL. Continuity of drinking water service is very low, with only two small utilities providing water 24 hours/day. The national average of 18 hours/day for the 50 EPSs in Peru, which provide services to the largest urban centers in the country, is considerably lower than that of Colombia’s 20 hours/day, as Colombia’s average includes all service providers, including more than 2,000 small towns. Large urban centers in Colombia, like Bogotá and Medellín, all have an average of 24 hours of service, while Lima has only 21. The average continuity of water service provision in large and medium EPSs is an unacceptably low 15 hours/day, and in small EPSs is 16 hours per day, which was the national average in Colombia in 1993.

Operating efficiency measured through levels of unaccounted-for water is also low. The average for unaccounted-for water is 42 percent at national level, and is even higher in the EPS segment. This statistic is also probably lower than what the truth is, given that the micro-metering level is only 51 percent on average, and so the estimated unaccounted-for water is probably underestimated. Of the 50 EPSs, only two small EPSs have over 90 percent metering but 14 have less than 10 percent metering. As a consequence of high losses, the levels of production of water is also very high, with 22 EPSs producing more than 300 liters per inhabitant per day (lphd), of which six produce more than 500 lphd. If water

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61 Empresa Metropolitana de Obras Sanitarias (Metropolitan Company of Sanitation Works)
62 Source: SUNASS, Informe técnico del ranking de las empresas prestadoras a nivel nacional (Año 2007).
63 Source: Comisión Nacional de Regulación de Servicios de Acueducto, Alcantarillado y Aseo (CRA), 2009. Information for year 2007
utilities had reduced their high levels of unaccounted-for water to a 25 percent average, SEDAPAL would have increased its revenue during 2007 by 139 million Peruvian soles and the other EPSs by 170 million soles, significantly changing the results presented in Table 8-8:

Financial performance

Financial performance of the average water utility is very weak. Most EPSs show a negative operating margin, as they are using their depreciation allowances to cover operating expenses. In 2007, operating margin of large EPSs as a group was -3 percent; -8 percent for medium size EPSs; and -15 percent for small EPSs. As such, the average local water utility was not able to pay its financial obligations during 2007. Similar or worse results were obtained during previous years. In such a circumstance, financial obligations guaranteed by the central government had to be paid directly by the Ministry of Economy and Finance, especially those obligations with international lenders such as KfW or JICA, in practice receiving subsidized investments from central government. In contrast, SEDAPAL had a 20 percent operating margin for 2007: a positive result but not an extraordinary one, as it has very high financial obligations.

Table 8-8: Simplified income statements, 2007

<table>
<thead>
<tr>
<th></th>
<th>Local WS&amp;S Utilities</th>
<th>SEDAPAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating revenues (Soles M)</td>
<td>277.18 101.87 40.13</td>
<td>419.18 866.82</td>
</tr>
<tr>
<td>Earnings before interest &amp; taxes (Soles M)</td>
<td>-7.73 -8.14 -6.10</td>
<td>-21.98 174.86</td>
</tr>
<tr>
<td>Operating Margin (including depreciation)</td>
<td>-3% -8% -15% -5%</td>
<td>20%</td>
</tr>
<tr>
<td>Estimated Unaccounted-for Water</td>
<td>46% 49% 54% 48%</td>
<td>37%</td>
</tr>
</tbody>
</table>

Source: Requena Sixto, with figures from SUNASS, indicators 2007.

Poor financial results are confirmed by information on the utilities’ balance sheets. As most EPSs could not pay their debts, accrued principal, interests, and penalties were added to their liabilities. However, water utilities balance sheets might not always show these figures, especially when such liabilities become part of a collective dispute, as illustrated by “Reimbursable Contributions” owed by water utilities to COLFONAVI by virtue of Law 27045, 1998. If reimbursable contributions were included in the balance sheets no water utility in Peru would be creditworthy, as all of them would had a debt/revenue ratio greater than two, SEDAPAL included. Without including COLFONAVI reimbursable obligations, SEDAPAL’s debt/revenue ratio would be smaller than two, and that of the average water utility greater than three. With a debt/revenue ratio equal to 1.87 SEDAPAL is on the borderline of creditworthiness.

Table 8-9: Water utilities debt/revenue ratios, 2007

<table>
<thead>
<tr>
<th></th>
<th>Water and Sanitation Utilities</th>
<th>SEDAPAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large Medium Small Total</td>
<td></td>
</tr>
<tr>
<td>Operating revenues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earnings before interest &amp; taxes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Margin (including depreciation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Unaccounted-for Water</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

64 Financial problems of water utilities are extensively documented in the World Bank Publication “Opportunities for a Different Peru” Chapter on Potable Water and Sanitation, by Iris Marmanillo.

65 Spanish acronym for Comisión Liquidadora del Fondo Nacional de Vivienda (National Housing Fund Liquidation Commission)
Debt/revenue ratio with COLFONAVI: 5.13, 8.61, 7.61, 6.21, 2.62
Debt/revenue ratio without COLFONAVI: 2.80, 3.93, 3.14, 3.11, 1.87

Source: Requena, S. with figures from SUNASS, indicators 2007, and water utilities’ financial statements when available.

Rural areas

Infrastructure conditions in rural areas. According to data from 2002, a main source of concern was the sustainability of the rural water infrastructure, which was significantly deteriorated and of which only a minority (less than a third) was considered sustainable. At the national level, more than half of the existing systems were deteriorated and an additional 12 percent seriously deteriorated. Serious deterioration and infrastructure collapse were particularly observed in the Selva macro-region. However, in the Costa, no rural infrastructure was considered sustainable, and 10 percent had collapsed. As a result, the government’s policies for rural areas have shifted from mere construction of systems to an integral approach, focusing not only on the quality of the infrastructure but also on the level of service offered and on the “soft” aspects like the management model and the capacity and education at the community level to create ownership and increase chances of sustainable provision of services. The sector shifted from an offer-based, top-down model with centralized decision-making in Lima to a more participatory, decentralized, demand-responsive approach focusing more on the long-term sustainability of the system than on the beginning of works.

<table>
<thead>
<tr>
<th>Macro-region</th>
<th>Sustainable</th>
<th>Deteriorated</th>
<th>Seriously deteriorated</th>
<th>Collapsing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costa (2002)</td>
<td>0</td>
<td>90</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Selva (2002)</td>
<td>15.3</td>
<td>38.5</td>
<td>30.8</td>
<td>15.4</td>
</tr>
<tr>
<td>Sierra (2002)</td>
<td>38.6</td>
<td>52.3</td>
<td>9.1</td>
<td>0</td>
</tr>
<tr>
<td>National</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>28.8</td>
<td>56.1</td>
<td>12.1</td>
<td>3</td>
</tr>
<tr>
<td>2003</td>
<td>31.7</td>
<td>66.4</td>
<td></td>
<td>1.9</td>
</tr>
</tbody>
</table>

(Deteriorated or seriously deteriorated)

Source: Lampoglia, T.

Wastewater treatment

Given the low access to sanitation services, only a small proportion of wastewater is adequately disposed of, causing significant environmental damage: 100,000 cubic meters of untreated water are released daily into surface waters, and 535,000 cubic meters are discharged directly to the sea. Only 392 municipalities report some level of wastewater treatment, while 1,236 municipalities do not have any wastewater treatment installations. In urban areas where water and sanitation services are administered by EPSs, only the wastewater generated by 29 percent of the population is treated. The service areas of SEDAPAL and the large EPSs generate 79 percent of the total volume of wastewater generated in the country (about 855,000 cubic meters per day).

No wastewater treatment is provided in eight regions: Amazonas, Apurimac, Huancavelica, Huánuco, Loreto, Madre de Dios, Pasco, and Ucayali. However, in five regions, the wastewater of more than 80 percent of the population served by EPSs is treated: Ayacucho, Ica, La Libertad, Lambayeque, and Tacna. However, these figures do not imply that the treatment processes, the quality of operation of the plants and the quality of the treated effluents is adequate. In fact, processes are not always adequate and
operation is deficient. It is evident that wastewater treatment in the country is a problem: coverage is low and the existing plants are inadequately operated. This stems from lack of financing, highly stringent effluent standards and inadequate institutional capacity. The outcome of the lack and inadequate wastewater treatment is contamination of receiving water bodies (an environmental problem) and public health risks to the population (a health problem). One problem faced by wastewater treatment systems stems from the fact that treatment plants have been designed to handle domestic sewage, assuming that non-domestic wastewater would be regulated under the existing normative framework. Lack of compliance has had a strong impact on the existing treatment systems, such as in Trujillo (industrial waste) or Cajamarca (oil and grease). A revision of existing norms to include stricter monitoring and enforcement procedures for industrial wastes is proposed by the VMCS but is still pending approval.

An additional problem related to wastewater in the country is the uncontrolled and inadequate re-use of effluents and raw wastewater for irrigation of vegetables and other edible crops. The coastal area of Peru is water scarce and farmers use raw sewage and effluents to irrigate crops. This happens on a significant scale in the surroundings of Lima and presents a public health risk. In this case again, regulation should be improved and standards adjusted in such a manner that they become realistic (that is, provide public health protection), and also achievable in terms of investment costs.

The wastewater disposal situation in Lima is an interesting case due to the importance of the city and as an example of the wastewater management situation in the country. Lima has several small wastewater treatment plants but most of its wastewater, at a total current flow of about 17 m$^3$/s discharged to the sea, directly on the shore, mainly at two points: La Chira and Taboada. The contamination of the sea in front of Lima is of the severest anywhere due to the large flows of untreated sewage discharged right on the beach, and due to the current patterns in the sea. The coastal waters in front of Lima are brown, topped with a white layer of foam. The coliform content in the sea water reaches several thousand per 100 ml. Solutions to the problem have been sought since the 1950s, with a large study undertaken every five to 10 years, most recommending the construction of two large submarine outfalls, one in La Chira and the other in Taboada. Various attempts to initiate respective projects were undertaken, but in practice nothing was done. An initiative to reuse part of the wastewater of the south of Lima in the Lurin area was attempted by constructing a conveyance and treatment system but this system suffered technical and structural problems and is inoperative.

In 2007 the government reached a decision to construct two submarine outfalls, one in Taboada (with a capacity of 14 m$^3$/s) and one in La Chira (with a capacity of 7.5 m$^3$/s), both with an adequate combination of pretreatment and outfall lengths. During the past two years, the government through ProInversión carried out a BOT (Build, Own, and Transfer) bidding process for the Taboada outfall. The process was successful and the winning bidder proposed preliminary treatment of the wastewater followed by a long and effective submarine outfall for discharge of the effluent to the sea, achieving through that combination a wastewater treatment and disposal method which complied with the reasonable standards existing at the time the bidding process was launched. However, recently, a new and much more stringent standard was adopted, requiring no more than 30 fecal coliforms per 100 mL in the sea water. This standard is the most stringent anywhere and requires a high level of pretreatment plus disinfection prior to discharge of the effluent to the sea. As a result, the contract with the winning bidder was not yet signed.

66 Vice Ministry of Construction and Sanitation
67 Cubic meter per second, usual unit for a fluid flow
68 The California Ocean Plan establishes that the water contact standard is no more than 200 FC/100 mL (FC is fecal coliforms). For areas of shellfish cultivation the standard is no more than 70 TC/100 mL (TC is total coliforms). The new Peruvian standard (Decreto Supremo No. 002-2008 MINAM, Estándares Nacionales de Calidad Ambiental

- 65 -
and it is doubtful that it will be signed.\textsuperscript{69}

The plans for the La Chira outfall have also been changed, from the concept of simple treatment combined with an effective outfall, to high-level treatment with disinfection. So a country that could not achieve the less stringent standard, which is the standard common to countries in the region, is now trying to achieve the most stringent standard of anywhere in the world. The attempt to pass from the worst to the best conditions in the world may prove to be inadequate due to financial restrictions, and despite this good will, the country could remain in the worst condition. It might be worthwhile to consider moving in stages, and providing the Taboada project with a waiver that would allow it to achieve the standard which was in effect when the bidding process started. Then, after construction, monitor and study the results and performance of the project, and if warranted, move in subsequent stages to achieving the more stringent standard. The same would hold for the La Chira submarine outfall.

\textit{POLICY, INSTITUTIONAL AND REGULATORY FRAMEWORK}

\textit{New policies and recent evolution in the institutional framework.} The institutional organization of the water supply and sanitation sector has undergone major changes in the last years. Up until the 1980s, water and sewerage services in urban areas, with the exception of Lima, were centrally provided under the responsibility of the State. The public water and sanitation services used to have high levels of subsidies from the State; the main sector target goal at that time was to increase coverage, without worrying about business efficiency. In the beginning of the 1990s, as part of a decentralization process, the responsibility for water and sanitation services was transferred to the municipalities. The Sanitation Services Law (Law 26338), passed in 1994, established that sanitation services must be provided by public, private, or mixed entities with functional and administrative autonomy. Provincial municipalities, which are responsible for sanitation service provision, are the ones in charge of granting service providers (public, private or mixed) with the rights to operate and provide water and sanitation services. Sector decentralization was further pushed forward in 2002 through the Organic Law on Municipalities (Law 27972), and the Decentralization Bases Law (Law 27783).

\textit{Sector institutions at the national level}

\textit{A single ministry responsible for the water supply and sanitation sector.} In 2002, the Organic Law 27779 created the Ministry of Housing, Construction and Sanitation (Ministerio de Vivienda Construccio n y Saneamiento, MVCS). The creation of this new ministry allowed concentrating responsibilities over the water and sanitation sector in one institution, responsibilities which were formerly shared by several different ministries. The MVCS is the ruling entity for the water and sanitation sector. Within the Ministry, the Vice Ministry of Construction and Sanitation (Viceministerio de Construcción y Saneamiento, VMCS) is in charge of formulating, approving, executing and supervising the country’s water and sanitation policies. The VMCS is currently implementing the Water for All Program (Programa Agua para Todos, PAPT). Within the VMCS, the National Sanitation Directorate (Dirección de Agua, 31 July 2008) establishes that the standard for marine ecosystems in coastal areas is no more than 30 TC/100 mL, and for cultivation of shellfish no more than 14 TC/100 mL. So according to the new law, coastal water needs to comply with no more than 30 TC/100 mL, which is more stringent than the California standard of no more than 200 FC/100 mL. To ensure less than 30 TC/100 mL a high level of treatment is needed (at least good secondary) and chlorination.

\textsuperscript{69} More information on the Taboada BOT process can be found in the section related to private sector participation.
Nacional de Saneamiento, DNS) is in charge of implementing these policies through the design of related norms and programs and through the promotion of best practices. The MVCS also implements investments in the service areas of the water utilities through PAPT. At present, the VMCS is planning to strengthen the strategic planning and policymaking role of its National Water Directorate (DNS) and to integrate PAPT and other programs into a Financing Fund for Water (INVERSAN). INVERSAN is envisioned as a leverage financing mechanism to strengthen WS&S utility corporate governance.

**National Regulator:** The National Agency of Sanitation Services (Superintendencia Nacional de Servicios de Saneamiento, SUNASS) was created in 1992 through the Law Decree No. 25965, and is the sector regulator. SUNASS reports directly to the Presidency of the Council of Ministers (PCM). In particular, the SUNASS is in charge of regulating the activity of the 50 Peruvian EPSs. The agency publishes regularly reports on the performance of the service operators and proposes management frameworks such as tariffs models. Originally, SUNASS was also assigned the regulation of the rural water operators (the JASS). However, this function was never effectively activated in practice. Due to the lack of adequate enforcement tools, SUNASS restricts its role mainly to a consultative one. Furthermore, the agency’s strategy relies on the assumption that the regulated bodies – the EPSs in the current situation – have the institutional capacity to comply with the established procedures, which is not the case for a majority of them. As an example, only eleven EPSs have had their investment plans and tariff structures validated by SUNASS, most of them having achieved this with the help and international support. Receiving and attending to users’ complaints about the service provided by EPSs are among SUNASS’ functions. To that end, SUNASS has established a Sanitation Services Users’ Claims Management Unit (Tribunal Administrativo de Solución de Reclamos de Usuarios de Servicios de Saneamiento, TRASS). The average time for answering claims is six days. Between January 2005 and April 2006, 15,403 claims were received by the TRASS, 65 percent of which concerned SEDAPAL and 17 percent, SEDAPAR. About two-thirds of the claims referred to excessive consumption.

In spite of the recent concentration of responsibilities in the recently created MVCS, other ministries still play a role in the sector. The MVCS must share responsibilities with other sectoral authorities for the establishment of quality standards that should be complied with by service providers and users alike in regards to water and sanitation public infrastructure. For water destined for human consumption, the Ministry of Health (Ministerio de Salud, MINSA) is in charge of defining and monitoring the standards for water quality. Within the Ministry of Health, the General Directorate for Environmental Health (DIGESA in Spanish) is more specifically in charge of that function. The representatives of MINSA at the regional and local levels are the Regional Health Directorates and the health centers. All Regional Health Directorates include an Executive Directorate for Environmental Health (DESA in Spanish). For non-domestic discharges, the Ministry of Production defines quality standards to be met by industrial wastewater, while the Ministry of Environment sets and monitors the quality of waste water discharged by the WS&S utilities in the natural environment. However, this last issue requires a tight coordination between these two sectors, which has not been effective to this date. The resulting legal vacuum on this matter makes it difficult to control discharges, which results in increased costs related to the early deterioration of sewerage infrastructure, overcharging of treatment systems (when available), and contamination of the final effluent with pollutants other than those from domestic origin.

The Ministry of Economy and Finance (Ministerio de Economía y Finanzas, MEF) also plays an important role in the sector, related to the terms of investment, sector planning, and regulation. The General Directorate of Multiannual Planning for the Public Sector (DGPMSP in Spanish) assesses the

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70 Plan Maestro Optimizado (PMO), see section on Planning for a more detailed description
multiannual strategic plans for each sector and the viability of selected infrastructure projects through the National Public Investment System (Sistema Nacional de Inversión Pública, SNIP). The General Directorate of Public Budget (Dirección General de Presupuesto Público, DGPP) plans and assigns budget resources to each sector, and the General Directorate of Public Credit (Dirección General de Crédito Público, DGCP) is responsible for approving and for issuing the national guarantee for any external debt or international cooperation for the sector. The Directorates of Public Budget (DPP) and Public Debt (DCP), determine to some extent the financing policies of water utilities. They do so by setting limits on their indebtedness and by guaranteeing their debts before local and international lenders. In practice MEF has been paying most local WS&S utilities debt obligations to bilateral organizations; it has also paid or pardoned water utilities tax liabilities. MEF is aware that had water utilities worked as actual corporations, their borrowing capacity would depend more on their own creditworthiness than on MEF’s guarantees. In fact, without their guarantees water utilities are free to borrow in the internal and external financing markets, provided they comply with their guaranteed financial obligations first.

The National Fund for State Enterprise Financing (Fondo Nacional de Financiamiento de la Actividad Empresarial del Estado, FONAFE). FONAFE is a public enterprise created in 1999 through the Law No. 27170, and endowed with the shares owned by the Peruvian government in several fully or partially publicly owned companies. These companies include utilities such as SEDAPAL and the rural electrification company ADINELSA, banks such as Banco de la Nación and COFIDE, and extractive industries such as Perupetro and Activos Mineros. FONAFE is governed by a board of Directors composed by the Prime Minister, the Minister of Economy and Finance, the Minister of Transport and Communications, the Minister of Housing Construction and Sanitation (MVCS), and the Minister of Energy and Mining.

National Housing Fund Liquidation Commission (COLFONAVI). Most water and sanitation utilities have debt obligations with COLFONAVI, the liquidation commission of the National Housing Fund (FONAVI), a fund that provided access to subsidized financing to both EPSs and users to extend the networks or connect to a public water and/or sewerage network during the 1990s. COLFONAVI claims the value of such debt is about US$800 million, while water utilities claim it is about a third of that figure. The utilities’ point of view is that they cannot be made accountable for existing debt with users in their area of service. Meanwhile, COLFONAVI wants to assign that debt to the EPSs, claiming that the extension of networks was and continues to be under the responsibility of the EPSs, and that those networks are under operation of the EPSs. This contentious issue affects the creditworthiness of most water utilities.

Subnational governments

Local governments. To comply with their public service obligations, local governments award an “operation contract” to the service provider, usually an EPS in larger municipalities. The contractual obligations in the exploitation contract are defined by specific service improvement targets based on the results and recommendations of an Optimized Master Plan (Plan Maestro Optimizado, PMO). Also, local governments participate in the board of directors of the EPSs with two seats. Until recently, local governments alone had total control over the board of directors of the EPSs, resulting in highly politicized utilities with high turnover of personnel and not very good results.

Regional governments. Regional governments are expected to play a role as a financier of the sector in their areas of jurisdiction. Unlike local governments, which are usually financially weak, most regional

71 Spanish acronym for Corporación Financiera de Desarrollo (Development Financing Corporation)
governments have large budgets in part funded by revenues from royalties received from mining companies. As such they could provide capital subsidies to their EPSs, municipalities and rural areas to expand service coverage in their regions. Regional governments have a seat in the board of directors of the EPSs, giving them some say on important decisions and on corporate governance.

Table 8-11: Summary of responsibilities in the sanitation subsector

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of sector policies</td>
<td>MCVS/VMCS/DNS</td>
<td>MCVS/VMCS/DNS</td>
</tr>
<tr>
<td>Prioritization of investments</td>
<td>MCVS/VCMS/DNS</td>
<td>OGPP – OPI(^{72}) Housing Ministry MEF/DGPMSP DRVCS(^{73})</td>
</tr>
<tr>
<td>Allocation of funds</td>
<td>MCVS/VMCS/DNS</td>
<td>MCVS/VMCS/DNS</td>
</tr>
<tr>
<td></td>
<td>MEF/DNEP, DGPP FONAFE (COLFONAVI)</td>
<td>MEF/DNEP, DGPP, FONAFE</td>
</tr>
<tr>
<td>Regulation</td>
<td>SUNASS</td>
<td>JASS</td>
</tr>
<tr>
<td>Pricing policies’ approval</td>
<td>SUNASS</td>
<td>EPS Municipalities</td>
</tr>
<tr>
<td></td>
<td>JASS</td>
<td>Community organizations</td>
</tr>
<tr>
<td>Technical norms</td>
<td>MCVS/VMCS/DNS</td>
<td>MINSA/DIGESA</td>
</tr>
<tr>
<td>Studies and works</td>
<td>EPA</td>
<td>Regional Governments PROMUDEH(^{75}) Municipalities NGOs MINSA/DIGESA Technical cooperation agencies</td>
</tr>
<tr>
<td></td>
<td>Regional Governments Municipalities INADE(^{74})</td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>EPS Municipalities</td>
<td>JASS</td>
</tr>
<tr>
<td></td>
<td>Community organizations</td>
<td></td>
</tr>
</tbody>
</table>

Source: Plan Nacional de Saneamiento 2006-2015, Lampoglia, T.

Autonomous agencies and private associations

The National Peruvian Association of Sanitation Service Providers (Asociación Nacional de Entidades Prestadoras de Servicios de Saneamiento del Peru, ANEPSSA) was constituted in 2001 as an association with the objective of gathering the country’s EPSs and organizing a dialogue and exchanges of experience between its members as well as acting as an interlocutor with the government entities. It now represents 32 out of the 50 EPSs in the country.

Professional Associations. According to current legislation, local professional associations should be represented on the Board of Directors of water utilities. This gives them some power to shape water utilities’ corporate governance and participate in top-level water utility decision making.

\(^{72}\) Public Investment Bureau

\(^{73}\) Spanish acronym for Direcciones Regionales de Vivienda, Construcción y Saneamiento (Regional Directorates for Housing, Construction and Sanitation)

\(^{74}\) Spanish acronym for Instituto Nacional de Desarrollo (National Development Institute)

\(^{75}\) Spanish acronym for Ministerio de Promoción de la Mujer y del Desarrollo Humano (Ministry of Women’s Promotion and Human Development)
Chamber of Commerce. Local Chambers of Commerce are also represented on the Board of Directors, and are expected to voice the interests of the economic sectors. As such, utility service policy might not only respond to the welfare of citizens but to the activities of the economic sectors.

PLANNING AND INVESTMENT PROCESSES

The National Water and Sanitation Plan (Plan Nacional de Saneamiento) aims at reaching a national coverage of 82 percent for water services and 77 percent for sanitation by 2015. These objectives are consistent with the Millennium Development Goals. They require providing access to water and sanitation services to, respectively, an additional 4.9 million and 8.7 million Peruvians between 2005 and 2015. They also aim to reach by 2015 a level of 100 percent wastewater treatment (i.e., the wastewater generated by 15.4 million people as well as industrial waters channeled through the public sanitation system). Reaching this objective will require major investments, better enforcement of existing norms, and significant institutional building, considering the current proportion of treated wastewaters (29 percent) and the low access to sewerage services (57 percent) in urban areas. The current administration has set even more ambitious targets for 2011 with the objective to reach a national coverage of 90 percent for water services and 83 percent for sanitation. This would require giving access between 2009 and 2011 to an additional 4.4 million Peruvians for water services and 7.1 million for sanitation. The estimated total cost is US$2.2 billion, which is expected to come from both public and private financing.

<table>
<thead>
<tr>
<th>Table 8-12: Coverage targets set by national planning instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water</strong></td>
</tr>
<tr>
<td>National coverage (%)</td>
</tr>
<tr>
<td>Urban coverage (% average)</td>
</tr>
<tr>
<td>Large EPSs</td>
</tr>
<tr>
<td>Medium EPSs</td>
</tr>
<tr>
<td>Small EPSs</td>
</tr>
<tr>
<td>Rural coverage (%)</td>
</tr>
<tr>
<td><strong>Sanitation</strong></td>
</tr>
<tr>
<td>National coverage (%)</td>
</tr>
<tr>
<td>Urban coverage (% average)</td>
</tr>
<tr>
<td>SEDAPAL S.A.</td>
</tr>
<tr>
<td>Large EPSs</td>
</tr>
<tr>
<td>Medium EPSs</td>
</tr>
<tr>
<td>Small EPSs PEQUEÑAS</td>
</tr>
<tr>
<td>Rural coverage (%)</td>
</tr>
<tr>
<td>Wastewater treatment (%)</td>
</tr>
<tr>
<td>Estimated cost (US$ million)</td>
</tr>
</tbody>
</table>

* --- indicates not available

Source: Lampoglia, T.

Investment planning in the EPS. The main planning tool at the level of the EPS is the Optimized Master Plan (Plan Maestro Optimizado, PMO). The PMO for each EPS has to be approved by SUNASS, according to which the PMO is a long-term planning tool defining needs in terms of investments and
resources for a period of around 30 years. Every PMO has to propose an investment program meeting the five following priorities: (1) improvement of water quality; (2) increased efficiency in the use of water resources; (3) increased access to water supply and sanitation services; (4) increase in the level of wastewater treatment; (5) and other required investment projects. Along with the planning of investments the PMOs are also required to determine the tariff structure and level (calculated according with SUNASS methodology) and the performance indicators to be achieved by the EPS. On top of being a planning tool, PMOs have been designed by SUNASS to act as a regulatory tool. Indeed, the PMOs proposed by EPSs for SUNASS’ approval have to match the proposed investment plan with the anticipated internal and external sources of resources. However, as mentioned earlier, very few EPSs have the capacity to prepare a PMO, and in fact only 11 out of the 50 EPSs in the country have had their PMOs approved by SUNASS so far. Several of the EPSs that have had their PMOs approved by the regulator have received technical assistance from international cooperation, and the VMCS is supporting certain EPSs in the elaboration of their PMOs through the hiring of consultants. In the absence of an approved PMO, SUNASS does not allow an EPS to revise their tariffs, except to reflect inflation. Although SUNASS is planning to devise and impose compulsory master plans to the EPSs not managing to prepare and get their PMOs approved, the implementation of this measure could be delayed by SUNASS’ own low capacities.

In the process of implementing their investments, the EPSs also have the obligation to comply with the National Public Investment System (Sistema Nacional de Inversión Pública, SNIP), an important but often a time-consuming process to ensure feasibility of the proposed investments. All investments made by non-financial public sector entities and companies must have “viability,” which is granted by the responsible entity according to the procedures established by SNIP. SNIP norms are also applied to investments carried out by third parties that will be later transferred to a public sector entity for operation. The main objective of SNIP is to guarantee that the projects are profitable and sustainable, both in social, economic and financial aspects. SNIP is comprised of MEF, through the General Directorate of Multi-annual Public Sector Investment Programming (Dirección General de Programación Multianual del Sector Público, DGPM); the Programming and Investment Offices (OPI) of all levels of national government (Oficinas de Programación e Inversiones del Gobierno Nacional, OPI-GN); in the case of the water and sanitation, the OPI of the MVCS, of regional governments (OPI-GR); and for local governments (OPI-GL), the Formulating Units (Unidades Formuladoras, UF), and the Implementing Units (Unidades Ejecutoras, UE) of each entity. The UFs are the ones responsible for the elaboration of the pre-investment studies, while the UEs are responsible for their implementation. OPIs are in charge of the project’s declaration of “viability.”

Economic, financial, social, and environmental feasibility studies are important to optimize the allocation of investments by financing viable projects. To date, despite some delays, SNIP has played an important role in the sector by guaranteeing the execution of profitable projects, avoiding distortions that had previously occurred in the implementation of projects at the national level. However, capacity building for the formulation, evaluation, and implementation of projects is needed if technical quality of the projects declared “viable” is expected. Given the importance for the sector to invest strategically in feasible projects, the VMCS should strengthen its capacity in project formulation and appraisal.

**SECTOR INVESTMENT AND FINANCING**

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76 As allowed by the Law to Optimize EPS Management, passed in 2006 (*Ley para optimizar la Gestión de las Entidades Prestadoras de Servicios de Saneamiento*: Ley No. 28870)
Recent evolution of sector investment. The water supply and sanitation sector underwent a period of accelerated investment during the second half of the 1990s with more than 350 million of dollars invested annually between 1996 and 1999, followed by a period of reduced investment from 2000 to 2005. Investment has increased recently with the inclusion of the sector in the priorities of the national government in 2006 and the formulation in 2007 of the Water for All programs (PAPT).

Figure 8-11: Evolution of water and sanitation investments

![Graph](image)

Source: IPE.

In the period between 2000 and 2005, SEDAPAL was responsible for 45.4 percent of all investments in the sector, with an estimated investment of US$378.1 million. The main investments projects of SEDAPAL during that time were: (i) Sanitary Improvement of Lima’s Marginal Areas Project (Proyecto Mejoramiento Sanitario de las Áreas Marginales de Lima, PROMESAL), with financing from IBRD\(^77\), JBIC\(^78\), and national resources, which included general water and sewerage works in the northern, center, and southern areas of Lima which recently closed; (ii) Coverage Expansion of Drinking Water Services and Wastewater Discharges Project (Proyecto de Ampliación de la Cobertura de los Servicios de Agua Potable y Saneamiento, PAC), with financing from IBRD and national resources, which expanded coverage of water and sanitation through condominial sewerage in the northern, center, and southern areas of Lima; (iii) Rehabilitation and Replacement of water and sewerage networks, financed by own resources; and (iv) Drinking Water Secondary Works Project in Human Settlements (Obras Secundarias de Agua Potable en Asentamientos Humanos, PROREDES), with financing from the Andean Development Corporation (Corporación Andina de Fomento, CAF), which implements drinking water and sanitation works in Lima’s cones and is still under implementation.

Table 8-13: Sources of investment financing

<table>
<thead>
<tr>
<th>ORIGIN OF FUNDS</th>
<th>1990-1999</th>
<th>2000-2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>URBAN SECTOR</td>
<td>US$</td>
<td>%</td>
</tr>
</tbody>
</table>

\(^77\) International Bank for Reconstruction and Development
\(^78\) Japan Bank for International Cooperation
PRONAP<sup>79</sup> 206.2 8.4% - -
Regional Governments 65.0 2.7% 60.1 7.2%
SEDAPAL<sup>80</sup> 637.0 26.1% 378.1 45.4%
PROMAR (Lima South)<sup>81</sup> 35.5 1.5% - -
FONAVI 563.9 23.1% - -
ENACE 12.3 0.5% - -
EPS<sup>82</sup> 498.3 20.4% 79.7 9.6%
A TRABAJAR URBANO - - 31.5 3.8%
gfMESIAS<sup>83</sup> - - 97.8 11.7%
PARSSA<sup>84</sup> - - 114.3 13.7%
TOTAL Urban 2,018.2 82.6% 761.5 91.4%

RURAL SECTOR
FONCODES<sup>85</sup> 361.5 14.8% 55.5 6.7%
Other Government Entities 41.8 1.7% - -
PRONASAR<sup>86</sup> - - 7.7 0.9%
NGOs 22.2 0.9% - -
TOTAL Rural 425.5 17.4% 63.2 7.6%
Others - - 8.5 1.0%
TOTAL GENERAL 2,443.7 100.0% 833.2 100.0%

Source: DNS, Lampoglia T.

Main national programs

Formulated in 2007, the PAPT is the most important program for the water sector in Peru and a flagship program of the current administration. It initially focused on access for poor neighborhoods in Lima. However, it soon changed into a national-level program, complementing investments in Lima with the National Rural and Small Towns Water and Sanitation Program (Programa Nacional de Agua y Saneamiento Rural, PRONASAR) and all other investment projects despite the source of financing having a national scale. With the specific objective of increasing service coverage, the PAPT until 2008 had concentrated on infrastructure investments with little focus on management and sustainability issues of the systems built under the project. The VMCS adopted a Ministerial Resolution No. 693-2008 indicating the rules to access financing from PAPT. It will be effective starting in 2010.

Figure 8-12: Percentage of investments in Water for All Program

<sup>79</sup> IADB
<sup>80</sup> Own resources and external loans (JBIC, IBRD, CAF)
<sup>81</sup> JBIC
<sup>82</sup> IADB (loan), KfW (part grant and part loan)
<sup>83</sup> OECF and own resources
<sup>84</sup> Partially funded by JBIC
<sup>85</sup> Includes initial phase of PRONASAR (IBRD loan)
<sup>86</sup> IBRD
PRONASAR has become part of the focus on improving sustainability of water and sanitation infrastructure in rural areas with more than 500 people and in small towns. It is estimated that around 80 percent of PRONASAR is dedicated to the rehabilitation of existing systems, and 20 percent to the construction of new infrastructure. As of March 2008, the total number of beneficiaries is estimated to be around 275,000 people.

The Rapid Impact Measures Program (Programa de Medidas de Rápido Impacto, PMRI) financed by the German Development Cooperation (GTZ), is implemented by the DNS and aims at improving the management of service provision in eight medium and small scale EPSs at a national level (Selva Central, Sierra Central, Moyabamba, Cañete, Chavín, Huaral, and Huánuco). It has a technical assistance grant and an investment loan to finance the construction or implementation of “rapid impact measures” aiming to improve the operational efficiency and the quality of the service provided. (For more information see Box 8.2.)

Box 8-2 - Rapid Impact Measures Program 88

The Program includes a grant and a loan from KfW to MEF, which will transfer it to participating water utilities (EPS).

Grant portion: The grant portion finances technical assistance to EPSs to help them work as commercially viable entities in line with current legislation, including: (i) preparing a PMO and getting approval from SUNASS, (ii) developing a model of “contrato de explotación” (operating contact) between local municipalities and water utilities in line with existing regulations; (iii) improving governance of EPSs by structuring a Board of Directors according to amended regulations.

Loan portion: To finance investments of participating EPSs. Investment cost recovery will be reflected in new tariffs. Loans will be added to the EPS balance sheet, and will be repaid by an earmarked portion of the new EPS tariff revenue captured by a trust fund (Fideicomiso) based on contractual agreement between the EPS and MEF.

Other programs. Other initiatives have been launched to improve the condition of water and sanitation infrastructure and to increase access. Among them, the German government, through the FCPA (Fondo Contravalor Perú-Alemania), has been financing water and sanitation investments for the past five years

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87 Spanish acronym for Dirección Nacional de Saneamiento (Sanitation National Directorate)

88 Source: informal information provided by the Director of the PMRI
in rural areas in the regions of Ayacucho, Huancavelica, Piura, and Lambayeque, benefiting 65,505 people in 107 localities. Other initiatives in rural areas have been launched in Cajamarca (PROPILAS) and in Cusco (SANBASUR). However, the extent of these initiatives is very limited compared to the ambitious targets set by the Peruvian government for 2011 and 2015.

Authorization to invest

According to current legislation, in place since 1994, investment programs within the water utilities service areas are to be approved by their Board of Directors. After they are approved within the water utilities’ commercial governance structure, the investment programs –as part of the PMO– have to be discussed with SUNASS to determine the tariff implications, as any tariff increases would need to be linked to progress in the implementation of investment programs. In the case of water utilities under a concession contract (e.g., Tumbes) the investment program has to be approved by the institution that signed the contract on behalf of the government. Also, if the program has financing from the central government, it would need to be authorized by the Directorate of Multi-Annual Programming at MEF.

In practice, investment activities within the service area of EPSs have occurred without following the procedures established by law. During the 1990s, a national water supply program (PRONAP) implemented investments in most EPS service areas without consulting the water utilities. Recently, the Water for All program has been implementing investments in a similar manner. In such a situation, although water infrastructure investment might be badly needed, many EPSs might not be prepared to take over the newly installed infrastructure. Also, as such investments are done without approval of the commercial governance structure of the water utilities and SUNASS, tariff increases, necessary to properly operate and maintain the new infrastructure, might not be granted. In the middle of this reality, KfW is financing the PMRI program to try to help EPSs work as a financially viable utility, following the procedures outlined in the Peruvian law. A similar attempt was tried in the late 1990s (Programa de Acciones Inmediatas), but with no investment component as an incentive. The Vice Ministry of Sanitation is also working actively to overcome this problem, possibly by the creation of a sector financial fund, INVERSAN.

Water tariffs

Confirmation of tariffs. On the political side the tariff increases authorized by SUNASS needed to be approved, before being implemented, by the General Stakeholder Board (Junta General de Accionistas) comprised, until recently, of the mayors of the municipalities. The final approval did not materialize on many occasions, since most politicians associate tariff increases with rejection from the population and negative political consequences. Since the Law to Optimize EPS Management (Law 28870) passed in 2006, the approval of tariff increases has been the responsibility of the companies’ Boards; however, the reduction of political interference is still to be confirmed. The fact that political authorities, as “owners of the companies,” tend to manage them in accordance with their own requirements, imposing actions in which political considerations supersede technical principles, is an issue that should also be considered. In spite of the fact that new legal dispositions regarding the boards’ composition have contributed to the reduction of political interference, there are still no evaluations on their concrete impact.

In the last few years, SUNASS has set and changed the rules that had generated debilitation and high costs to the companies, without a positive impact in the companies’ management. The current regulatory model considers short-term tariffs (five years) established under financial criteria. Some specialists contest the effectiveness of this model, arguing that to achieve the companies’ sustainability, determining a long-term tariff under economic criteria, should be the practice.
Recently, a “Simplified Procedure for the Approval of the Tariff Formula for Self-sustainable Investment Projects” has been approved. This procedure, however, is not aimed at simplifying the current procedure in general; it is only to be applied in specific cases, in particular in projects with private sector participation. It is interesting to note that the procedure mentioned has not been formulated by SUNASS, which could put into question the independence of the regulator.

**Tariff levels for EPSs**

In practice, in the early stage of reforms, SUNASS approved tariff increases to all urban water utilities, without applying the principles and procedures as required by law. This was done in 1994, during an 18-month period in which all urban WS&S utilities and SUNASS were expected to build up their capacities to implement their new mandates. In this period tariffs increased almost 600 percent, from about US$0.06/ m³ in 1994 to about US$0.40/ m³ in 1996; this tariff increase was supposed to provide enough revenue to cover operation and maintenance (O&M) costs and to contribute to the financing of investments. Since then, tariffs for water utilities have been maintained at virtually the same level in dollar terms (US$0.39/ m³), except for SEDAPAL, whose tariffs increased from US$0.42/ m³ in 1996 to US$ 0.56/ m³ in 2007. In soles, tariffs for EPSs increased about 30 percent and for SEDAPAL 75 percent in the 1996-2007 period; tardiness in presenting their PMOs to SUNASS might explain lower increases for local utilities.

<table>
<thead>
<tr>
<th>Year</th>
<th>Other Water and Sanitation Utilities</th>
<th>SEDAPAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large</td>
<td>Medium</td>
</tr>
<tr>
<td>1994</td>
<td>0.1</td>
<td>0.05</td>
</tr>
<tr>
<td>1996</td>
<td>1.06</td>
<td>0.44</td>
</tr>
<tr>
<td>2007</td>
<td>1.32</td>
<td>0.41</td>
</tr>
</tbody>
</table>

*Source: SUNASS, Water Supply and Sewerage Utility Indicators (2007).*

**Investments in the EPS segment**

Investment activity in EPS service areas was paralyzed from the early 2000s to 2006, with the exception of SEDAPAL. Recently the investment activity has dramatically increased, from US$89 million in 2006, to more than doubling in 2007 (US$184 million) and increasing to US$556 million in 2008. This increase is explained by the launching and implementation of the Water for All Program (PAPT), which started in February 2007. Between 2007 and 2008, PAPT channeled investments of about US$467 million into most urban areas served by the water utilities. By the year 2008, the PAPT program dominated the investment activities in the urban water sector, handling investment projects of about US$412 million or 74 percent of all investments implemented in the urban water utilities service areas. Compared with PAPT program, EPS’ own investment programs have been very limited over the last three years, although they

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89 Supreme Decree 014-2008 VIVIENDA
90 Self-sustainable investment projects are: (1) projects that are contemplated within the current PMOs whose implementation needs to be brought forward; (2) projects initiated through private initiative; and (3) modifications or updates of the previously mentioned investment projects in relation to investment amounts, operation and maintenance.
were reactivated in 2007 (Table 8-15: ).

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>%</th>
<th>2008**</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water for All Program (PAPT)*</td>
<td>0</td>
<td>55.00</td>
<td>33%</td>
<td>411.67</td>
<td>74%</td>
</tr>
<tr>
<td>Water Utilities Inv. (excludes PAPT)</td>
<td>88.67</td>
<td>129.27</td>
<td>70%</td>
<td>144.67</td>
<td>26%</td>
</tr>
<tr>
<td>- SEDAPAL</td>
<td>74.33</td>
<td>87.93</td>
<td>48%</td>
<td>99.67</td>
<td>18%</td>
</tr>
<tr>
<td>- Local Water Utilities</td>
<td>14.33</td>
<td>41.33</td>
<td>22%</td>
<td>45.00</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>88.67</td>
<td>184.27</td>
<td>100%</td>
<td>556.33</td>
<td>100%</td>
</tr>
</tbody>
</table>

* Includes SEDAPAL ** Preliminary.

Investments handled by the PAPT program are not done according to the plans of the water utilities, as they are not included in their PMOs, except perhaps in the case of SEDAPAL. PAPT program does investment planning in a centralized manner for all its investments and gets them approved by the MEF.

Given the operator’s lack of resources, the central government has financed the needed investments in the service areas of EPSs, which are usually made in an urgent manner to solve pressing problems, and many times end up answering to political considerations. In those cases the quality of the investment is less than expected, and the lessons learned in the sector are not taken into account. The invested resources run the risk of becoming unprofitable and unsustainable.

Currently most investments in the water utilities service areas are financed through capital subsidies from the central government (75 percent). By doing so, the central government uses its tax revenue, complemented by loans from the World Bank (PRONASAR\(^91\)), IADB, KfW\(^92\), JBIC and other donors. Tariff revenue plays a marginal role, dominated by SEDAPAL with about 19 percent contribution to total funding (3 percent recurrent and 16 percent FONAFE reinvested profits). Financing with loans to water utilities represents about 6 percent of total financing, although this figure might be underestimated, as it only includes loans to SEDAPAL.

**Estimated investment needs**

Given the high urban growth rate in Peru (above 2 percent) and as access to safe water coverage rate is 86 percent, compared with 84 percent in 1990 (Millennium Development Goals [MDG] baseline), the water supply distribution network and production capacity will require major investments, including in efficiency improvements. If Peru achieves the MDG target in access to safe water, its access to safe water coverage rate by the year 2015 would be 92 percent. The MDG target in access to sewerage by the year 2015 in Peru is 90.5 percent, compared with 77 percent by the year 2007.\(^93\) It is estimated that to achieve the MDG targets in water and sewerage, Peru would need investments in the sector of about US$2.5 billion over the period 2006-2015, which is equivalent to about US$250 million per year. If additional investments in wastewater treatment are included, to comply with Peruvian environmental regulations, total investment needs would be US$3.7 billion or about US$367 million per year.

\(^91\) National Rural Water Supply and Sanitation Project, financed by the World Bank
\(^92\) KfW Entwicklungsbank, a German development bank
\(^93\) Coverage rates source: SUNASS performance indicators 2007 and WHO-UNICEF Global Assessment 2000 for MDGs baseline
**Table 8-16: Urban water sector investment needs 2006-2015 (millions US$)**

<table>
<thead>
<tr>
<th></th>
<th>Water and Sewerage</th>
<th>Wastewater Treatment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Expansion</td>
<td>Rehabilitation.</td>
<td>Total</td>
</tr>
<tr>
<td><strong>SEDAPAL</strong></td>
<td>922</td>
<td>290</td>
<td>1,212</td>
</tr>
<tr>
<td><strong>Other Utilities</strong></td>
<td>1,000</td>
<td>328</td>
<td>1,328</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,922</td>
<td>618</td>
<td>2,540</td>
</tr>
</tbody>
</table>

\(^1\) Estimated investment needs to achieve the MDGs  
\(^2\) Estimated investment needs to comply with national environmental regulations  

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**EXPERIENCES OF PUBLIC-PRIVATE PARTNERSHIPS**

Despite its general interest in engaging in partnerships with the private sector for the development of infrastructure, the government of Peru has been slow in attracting private operators and investors to the water and sanitation sector. During the 1990s the government had intentions of developing concessions for larger EPSs, like other middle income countries in the region, however with no luck. It was only in 2005 that the first of a few concessions under preparation in the water and sanitation sector was signed. However, other similar concessions under preparation were aborted, as the consumers, the government and private operators were unable to develop the trust needed to engage in a long term partnership.

**The main options for PPPs, duly supported by relevant legislation, are grouped in three main categories:**

*Concession contracts based on final design (Licitaciones Publicas)* – Bidders are given final design of infrastructure projects, upon which they prepare their technical and financial proposals for construction, operating and maintenance of infrastructure. The government (various infrastructure ministries) believes this option takes too long to mature and might be too costly if it does not materialize.

*Concession contracts based on preliminary designs* – Bidders are given main technical parameters of technologies to be used and quality of service to be attained based on preliminary system design and planning. With this information, bidders present their technical and financial proposals for doing final design, construction, operation, and maintenance of the proposed infrastructure.

*Concession contracts based on private initiative proposals* – The private sector can identify projects that it believes are needed to solve infrastructure problems. Based on this identification it can present a proposal to a ministry or other relevant agency, which then could choose to accept or reject the proposal as being of interest to the government. Based on this acceptance notice the private proponent develops a Design, Build, Operate and Maintain (DBOM) proposal. Once the DBOM proposal is presented, the government opens a public tender process, in which third party tenders can participate. If a third party tender offers a more competitive bid, the original private proponent of the project has the right to re-bid.\(^{94}\) Under this option, if the private sector finances 100 percent of the deal, it does not have to receive the approval of the National System of Investment (SNIP), as the government does not need to budget for it.

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\(^{94}\) This option was originally conceived for very localized service infrastructure projects like malls (e.g., the Larco Mar Mall concession), public parking lots, etc. However, it began to be utilized for presenting the recent wastewater treatment plants in Metropolitan Lima. A new law (DL 1012) had to be passed to make sound use of this option in infrastructure projects.
Within this public-private partnership framework, ProInversión awarded a concession contract for a water supply production plant in Lima to Consorcio Aqua Azul (CAA) in the early 2000s. CAA sells potable water to SEDAPAL, which pays for it using tariff revenues. In this concession contract the contractor was responsible for arranging 100 percent of the financing through equity and loans. The Private Pension Funds (PPFs) and other local financiers took part of the financing risks (see Box 8.3). At present CAA has an AAA APOYO/Fitch risk rating in the Peruvian market.

Box 8-3: PPFs finance a pure concession contractor in water infrastructure

Consorcio Aqua Azul (CAA) took full design, financing and construction risks. However, there is a purchase guarantee of a minimum quantity of water per year, based on which the cash flow of CAA is almost certain. Based on its contract, and on the technical and corporate reputation of its owners, CAA went public and issued bonds in the Lima Stock Exchange, for a maximum of US$45 million. PPFs acquired various series of CAA bonds beginning 2001 for about US$10 million; by 2003 PPFs holding of CAA bonds were US$18 million. The revenue from the issuance of bonds was used to pay for infrastructure investments for the project and to pay principal and interest on a bridge loan and other related expenses.

Source: Summary of case by L. Masias and L. Paz Delgado: PPFs Inversión en Proyectos de Infraestructura.

More recently, private operators active in the water, sewerage, and wastewater treatment sectors are trying to act as originators of concession contracts, fully financed by them using the “private initiative proposal” option for PPPs. The concession contracts are to be awarded to the winning proposal by the MVCS (as a guarantor on behalf of the GoP) together with SEDAPAL (as payer for the infrastructure services). As the source of payments will be tariff revenues collected by SEDAPAL, it is thought that SEDAPAL can issue Irrevocable Certificates of Payments for Capital Investments whose value will be estimated using the fixed portion of the tariff that remunerates capital investments (Remuneración por Inversion, RPI). The certificate of payment is conceived to be freely transferable and with no link to any performance, similar to the CRPAO issued by the GoP in the IIRSA projects (see Box 8.5). The private sector has also requested a guarantee from the government of Peru, stating that it will pay in case SEDAPAL cannot pay. Proponents of this guarantee call it “Nil Guarantee,” as future certificate payments will be in SEDAPAL’s budget rather than in the MVCS budget. Having the “Nil Guarantee” of the GoP, private investors in the wastewater sector believe they will get cheap financing in the financial market, as they will be using the investment grade risk rating of the GoP.

Box 8-4: A strategy to get competitive market financing

CRPAOs: Certificado Reconocimiento de Pago por Avance de Obra

Design-Finance-Build-Operate (DFBO) concession contractors in roads in Peru are getting competitive finance from PPFs, thanks to the GoP’s investment grade (IG). GoP’s IG qualification is transferred to the DBFO contractor by simple issuance of CRPAO, each time the contractor has completed a section of the construction contract. The CRPAO is a future irrevocable payment obligation (for the investment cost of the road) by the GoP. CRPAOs are freely transferable, independent of performance of any kind, as specified in the DBFO contract. As such, as soon as the DFBO contractor gets its CRPAO he can sell it in the market for cash to finance its investment program. Recently, Goldman Sachs helped raise funds by issuing bonds (Interoceánica IV) backed by future CRPAO revenue in the NYSE. The proceedings are being used to purchase CRPAO as soon as they become available, ensuring that the DFBO contractor will get its cash to finance its investment program. PPFs bought bonds whose market value is about US$116 million (yield less than 8 percent). In so doing it is financing road construction.

Source: Requena, S.
Taboada wastewater treatment plant for Lima

The government, through ProInversión (the national agency for the promotion of private sector participation), is also developing some water treatment projects in partnership with the private sector for the municipalities of Lima and Callao served by SEDAPAL. ProInversión’s Sanitation and State Projects Committee, through an agreement confirmed by its Directive Council, approved the declaration of interest of a private initiative undertake the Taboada Waste Water Treatment Plant project in December 2007. The project is in the National Plan of Sanitation 2006-2015 of the Ministry of Housing, Construction, and Sanitation, aiming to increase the coverage of wastewater treatment in Lima and Callao. Within the deadlines mandated by law, seven companies/consortia expressed their interest in executing the project. According to the corresponding evaluation, the seven companies/consortia were found to meet the screening requirements set forth in the statement of interest and, therefore, the respective companies and consortia were shortlisted as interested third parties in executing the project. By virtue of the above, ProInversión called for a competitive bid, concerning the comprehensive project, in order to award to the private sector the design, financing, construction, operation and, maintenance of the Taboada Wastewater Treatment Plant Project.

The concession (a Build, Operate, Transfer scheme) will comprise the design, financing, construction, operation, and maintenance of the planned facility. The project will be located at the intersection of Av. Néstor Gambetta and Av. Canta Callao, near the Jorge Chávez International Airport. The project will be comprised of the treatment of wastewater from the north pipe, the Comas Chillón collector pipe, and the Sarita Colonia drive line, as well as the final disposal of the treated effluent, in strict observance of the applicable sanitation regulations. The concession holder will build the necessary infrastructure facility and will provide SEDAPAL the wastewater treatment and final effluent disposal service. It will receive compensation resulting from its Economic Offer. To date, the government has yet to sign the contract.

### Box 8-5: Main characteristics of the Taboada Wastewater Treatment Plant

**Modality:** BOT Concession  
**Term:** 25 years

**Construction:** The construction stage should not exceed forty-three months. Within that term, the Concessionaire should build and implement: (i) a facility of preliminary treatment or pre-treatment for flow over 4 m³/s, in a maximum term of eighteen (18 months); (ii) a first stage that enables the treatment, according to appropriate technology and treatment processes proposed in their Technical Proposal for a flow over 4m³/s, in a maximum term of twenty-four (24) months; and (iii) The last release of the wastewater treatment through a submarine outfall.

**Design parameters:** The project's average design flow should reach 14 m³/s. The maximum hourly flow for the design of the pumping station, pre-treatment units, the disinfection system, and the sub-aquatic infrastructure for final effluent disposal shall be 20 m³/s.

**Estimated investment costs:** The project’s total benchmark investment cost, all elements comprised, including its design, construction and start up, is 873 million soles. The Value Added Tax (IGV) is not included.

**Operation and Maintenance:** The annual operation and maintenance benchmark cost, all items comprised, reaches 27 million soles. The Value Added Tax (IGV) is not included.

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95 This initiative was filed by the Taboada Concession Consortium in the framework of Law N° 28059, or Decentralized Investment Promotion Framework Law, and the corresponding regulations. This declaration of interest was published in the official gazette El Peruano and in Gestión Daily on December 20 and 21, 2007, as well as on the ProInversión website.
The Tumbes concession

_The first water concession in Peru._ The first public-private contract in the sector was awarded to operate water and sanitation services in the city of Tumbes in the year 2005. Peru’s Private Investment Promotion agency, ProInversión, was in charge of the preparation of the studies and contracts for the concession and the municipalities of Tumbes, Zarumilla, and Contralmirante Villar were the delegating authorities. The MVCS was responsible for the supervision of the investments and SUNASS in charge of the contract’s regulation.

_A hybrid contractual model._ The contractual model that was adopted is in fact a hybrid of concession and operation contracts, with a gradual increase in the concessionaire’s financial, technical, and managerial responsibilities. The 30-year contract indeed presents two separate stages. In the first stage, covering the first five years of the contract, most of the investments fall under the responsibility of the public sector, mainly through the means of a mix of a concessional loan and grant financed by KfW. Moreover, the concessionaire has to comply with an investment and management framework prepared by the ProInversión agency and specified in a PMO.

<table>
<thead>
<tr>
<th>Source of financing</th>
<th>Amount (US$ Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KfW Loan</td>
<td>10.8</td>
</tr>
<tr>
<td>KfW Grant</td>
<td>12.7</td>
</tr>
<tr>
<td>Local public sector</td>
<td>4.0</td>
</tr>
<tr>
<td>Concessionaire</td>
<td></td>
</tr>
<tr>
<td>- First 5 years</td>
<td>5.0</td>
</tr>
<tr>
<td>- Year 6 to year 30</td>
<td>72.5</td>
</tr>
</tbody>
</table>

_Source: ProInversión, 2005._

This contractual arrangement removes the need for a rapid tariff increase in the first years of the concession and leaves the concessionaire some time to improve the efficiency of the utility before imposing cost recovery. The initial non-reimbursable investments, falling under the responsibility of the government, translate however into a general subsidy to the utility and go against the principles laid out in the sector’s policies (namely, full cost recovery with some subsidies targeted toward the poor). The operator started its activities in October 2005 with a five-year management framework expressed in terms of a schedule for the improvement of 10 performance indicators.

<table>
<thead>
<tr>
<th>Management indicators</th>
<th>Unit</th>
<th>Year of contract</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>New water supply connections</td>
<td>nº</td>
<td>2,422</td>
</tr>
<tr>
<td>New kiosk connections</td>
<td>nº</td>
<td>0</td>
</tr>
</tbody>
</table>

_Table 8-17: Financing structure of the Tumbes concession_

_Table 8-18: Management indicators for the concession_

Competitive factor: The lowest actual value of Annual Remuneration per Services (RAS) as well as the Investment Compensation (RPI) and Operation and Maintenance Compensation (RPMO).

Source: ProInversión’s website, July 2009.
Mitigated achievements. In 2007 and 2008, SUNASS sanctioned the concessionaire for not meeting the goals laid down in the management framework. The concessionaire had outperformed on indicators directly linked with its commercial performance, such as the increase in the active rate and reduction of the unaccounted-for water but also on the improvement of minimum pressure and wastewater treatment. However, it had indeed failed to meet its other objectives in terms of coverage extension (water and wastewater connections). From the user’s perspective, there is a significant disparity in the perception of the operator’s performance between the different municipalities. The residents of Tumbes and their municipal representative are universally satisfied with the concessionaire’s performance, while residents of the other municipalities (Zarumilla, Zorritos, La Cruz) are generally unsatisfied with the service they receive and critical about the concession contract.

Stakeholders need to learn how to use the contract they have been left. Imperfect information on the initial state of the infrastructure appears to be one of the main issues leading to this situation. The discontinuity between the involvement of ProInversión in the preparation of the concession and its withdrawal from the subsequent phases of the PPP is another problem that appears in the case study. Although there are provisions in the contract that could allow some adjustments to be made in order to respond to the issue of imperfect initial information, it appears that these legal tools have not been used. The stakeholders that are actually involved in the life in the contract - that is, the municipalities, the concessionaire, and the regulator - still have to adapt to the legal agreement they are bound to, and to work together.

Repercussions outside the perimeter. However, the current problems with the Tumbes contract have repercussions outside the concession perimeter, with the effect of slowing ongoing negotiations and decreasing the interest of other local governments in the participation of the private sector in the provision of municipal services.

Small private water and sanitation service providers

Among smaller cities and towns the government had the same intention of piloting models for improved management of systems and promotion of local private sector participation. The first pilots were developed by the Small Towns component of PRONASAR, which has been successful in the establishment of about six specialized operators and activities ongoing in about 18 small towns throughout the country. In parallel other pilot experiences were developed through a donation from the Canadian Government, and implemented with support of the Water and Sanitation Program of the World Bank, in 11 small Peruvian towns.

Source: SUNASS.

<table>
<thead>
<tr>
<th>New sewer connections</th>
<th>n°</th>
<th>1,069</th>
<th>2,234</th>
<th>2,417</th>
<th>1,995</th>
<th>2,252</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuity</td>
<td>h/d</td>
<td>9</td>
<td>15.6</td>
<td>20.4</td>
<td>21.6</td>
<td>23.5</td>
</tr>
<tr>
<td>Minimum pressure</td>
<td>m.c.a.</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Wastewater treatment</td>
<td>%</td>
<td>14</td>
<td>14</td>
<td>22</td>
<td>75</td>
<td>80</td>
</tr>
<tr>
<td>Metering</td>
<td>%</td>
<td>11</td>
<td>26</td>
<td>48</td>
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<td>86</td>
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<tr>
<td>Unaccounted-for water</td>
<td>%</td>
<td>76</td>
<td>67</td>
<td>55</td>
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<td>31</td>
</tr>
<tr>
<td>Working ratio</td>
<td>%</td>
<td>84</td>
<td>73</td>
<td>61</td>
<td>58</td>
<td>49</td>
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<tr>
<td>Active water supply connections</td>
<td>%</td>
<td>58</td>
<td>67</td>
<td>76</td>
<td>86</td>
<td>95</td>
</tr>
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Source: SUNASS.

Spanish pressure unit: metro de columna de agua (water column unit)
THE ADVERSE IMPACTS OF CLIMATE CHANGE

High mountain ecosystems are considered strategic because of their importance in the water cycle (regulating water outflow and supplying high-quality water for social and economic uses); they are also in great danger. Thus, one of the most important environmental services of the high Andean systems is to supply potable water, and water for power generation and irrigation. High mountain ecosystems offer other natural goods and services such as storage and distribution of nutrients, CO2 capture, protection against soil erosion, and the filtering and purification of pollutants. As temperatures increase, the biota in high mountains will have no place to go. In addition, the mountains contain the headwaters of most rivers in the region and a significant fraction of lakes that are the primary source of potable water. Large cities in the region are dependent on glacial runoffs for their water supply. Global warming will affect evaporation rates and very possibly reduce the net supply of water. Moorlands (páramo), a unique high mountain ecosystem, characterized by a high degree of endemism, and a known water supply regulator in the region, may be at the greatest danger. Studies in Colombia show that at the current rates of temperature increases, these ecosystems may totally collapse in the course of the century. No one really knows the extent of all the downstream impacts.

Peru contains roughly 71 percent of the world’s tropical glaciers. Recent measurements show declines in glacier volumes which are likely to result in substantial impacts on water flows to Andean valleys. For instance, since the early 1980s Peruvian glaciers have lost about 22 percent of their surface (500 km2), equivalent to 7,000 million cubic meters of water (about 10 years of water supply for Lima). Peru also has over 12,000 lakes and ponds that could be destabilized by glacier melting.

Figure 8-13: Glacier in the Peruvian Andes in 1980 and from the same position in 2002

Source: Cordillera Blanca, Peru (Lynas, Bryan and Mark).97

At lower mountain altitudes, observed climate changes include deterioration of watersheds and depletion of water recharge capacities, increased likelihood of flash floods, and biotic changes in ecosystem thresholds and composition. There is substantial risk of glacial lakes causing flash floods and placing large downstream populations and infrastructure at risk. These dramatic hydrological and ecological changes will likely result in a loss of global biodiversity, in addition to losses in ecosystem-dependent goods and services, especially in potable and agricultural water supplies, and associated hydropower potential, including the loss of traditional water management and agricultural practices and techniques. Furthermore, the combined impacts of global warming (El Niño Southern Oscillation) and extreme weather events on mountain hydrology are likely to diminish the water flow used by populations downstream, and to have devastating impacts on highland and associated downstream ecosystems, altering the ecology and livelihoods of millions of people.

To understand vulnerability, develop adaptive capacity, and devise mechanisms to address these potential impacts, the Government of Peru has formed the National Council on Climate Change (CNCC), a consultative technical group which is part of the Structural Framework of Environmental Management. The result of this effort is a National Climate Change Strategy, which is a basis for the formulation of a nationwide program on climate change, with an emphasis on adaptation to anticipated impacts. The strategy calls for: i) strengthening of regional and national climate observation systems to facilitate their integration with worldwide networks; ii) identification of a National Research Agenda; iii) evaluation of the country’s present and future vulnerability; and iv) prioritized evaluation of specific ecosystems, for example, mountain ecosystems and the availability of glacier-fed water resources.

Despite the expected negative impacts on the availability of water resources, the water and sanitation sector has been slow in incorporating adaptation measures into sector planning activities. Adaptation to climate change must be placed front and center in sectoral discussions, ensuring that policymaking bodies in central government effectively tackle these issues within the master plans of water and sanitation utilities. Ensuring adequate resources for the drinking water supply should be at the core of the activities promoted by the government. The development of communication tools between central and subnational governments, water consumers, and civil society is needed to promote a more rational use of water resources in Peru.
Box 8-6: Adaptation to the impact of rapid glacier retreat in the Tropical Andes Project

With support from the Global Environment Facility Special Climate Change Fund (GEF-SCCF), the project aims at addressing the impacts of climate change on agriculture, energy generation, and basic sanitation in two river basins (Mantaro River Basin, and Vilcanota-Urubamba Basin). These basins have been selected based on the high degree of nearby glacier retreat and the speed at which these climate change-related phenomena occur.

The project, which also includes interventions in Bolivia and Ecuador, seeks to contribute to strengthening the resilience of local ecosystems and economies to the impacts of glacier retreat in the Tropical Andes, through the implementation of specific pilot adaptation activities that illustrate the costs and benefits of adaptation.

In Peru, the project includes the following pilots:

Pilot 1: Implementation of a Water Management Plan. Aiming at: (i) improving water use practices in the agricultural and livestock sectors, and (ii) improving water storage infrastructure at selected basins’ headwaters to address negative effects caused by temporary increase in runoff (GEF-SCCF contribution US$815,000; total cost US$4.64 million).

Pilot 2: Implementation of an Agricultural Production Plan that compensates for reduction of water availability to the agricultural sector as a result of rapid glacier retreat. The pilot implements a plan for the diversification of agricultural production which will aim to improve competitiveness and food security, reduce agricultural production losses, and implement agricultural good practices adapted to the anticipated consequences of glacier retreat in the area.

Pilot 3: Implementation of an Integrated Water Management Plan that incorporates reductions in glacier runoff in Huancayo. This seeks to improve the availability of water for human consumption by rationing the use of water and by conducting research on alternative water supply sources.

Monitoring of glacier retreat in the region. In addition to these pilots, the project has a component aiming at monitoring glacier retreat in the region. This component would support: (i) the installation and operation of a monitoring network to measure the gradual process of glacier retreat in the region, in order to better enable long-term planning for further adaptation of policy and interventions; and (ii) analyzing and monitoring the behavior of tropical glaciers and related wetlands in light of climate change.

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**MAIN CHALLENGES AND RECOMMENDATIONS**

**Strategic priority No. 1: Increase water and sanitation coverage to achieve MDGs and reduce disparities in access to services.**

Access to water and sanitation services in Peru is below the regional average and among the lowest when compared to other middle income countries in the region. Those without access are the poorest populations and are concentrated in those departments with a higher proportion of rural residents. Within the urban segment, those living in peri-urban areas and small towns have the least access to water and sanitation, and within the rural areas, those living in dispersed and remote areas are the ones with the lowest access rates.

**Figure 8-14: Water and urban sanitation coverage in Peru and LAC**
Recommendation No.1: Target interventions to reduce regional and socioeconomic disparities, using the region as the planning unit. The experience of PRONASAR, prioritizing investments in rural water and sanitation in departments with the lowest coverage rates, is a good mechanism to ensuring that new investments are aimed at reducing regional disparities; it also will be important that other sources of funding follow the same criteria. At the regional level, the process of prioritizing investments in a participatory manner, with regional and municipal authorities, as well as with communities, not only improves transparency but also allows for better targeting of those with the highest needs. The implementation of the participatory Integrated Regional Sanitation Plans\footnote{Metodología para la formulación de los Planes Regionales de Saneamiento Integral, Sept., 2008. DNS, VMCS & PAS-BM.} has proven to be a good tool for planning sector investments in a transparent manner at the regional level. Unfortunately, the tool has only been implemented in four departments; it is important that the VMCS and DNS take the lead in promoting the use of this tool more widely and prioritize its applications in those regions with the highest needs.

Recommendation No. 2: Develop specific strategies by market segment; promote the use of appropriate technologies and ensure effective access to services by beneficiary population, especially the poor. In urban areas those living in peri-urban areas and in small towns are the ones disproportionally lacking access to services. To increase coverage, the use of appropriate technologies is required, not only because lower investment costs make it possible to serve a larger quantity of population, but because lower operation and maintenance costs are more likely to be affordable to the dwellers of these communities.

In urban areas access to sanitation usually lags behind access to water. This coverage gap is related to higher sanitation costs. The use of conventional technologies not only makes access too expensive but imposes additional intra-domiciliary costs to connect, that in many cases prevents poor population from accessing sewerage networks. Experience in SEDAPAL with condominial technology, together with strong investments in social work and training, has proven successful in increasing access to sanitation in Lima’s poorest neighborhoods. This strategy should be replicated in other peri-urban areas of the country and, when relevant, in small towns.

In small towns the needs are similar, however, in those with lower population densities, the sector should promote the use of individual solutions like septic tanks, or when needed, sewerage systems of reduced
diameter, and condominial technology.

**In rural areas** individual sanitation solutions should be promoted, offering a wide range of options to respond to the demands of rural population, keeping in mind that the conventional latrine has proven to be unsustainable in rural Peru in communities with access to a water connection. The DNS should be working closely with DIGESA in the approval of norms for the wider application of flush latrines that offer the conveniences of a modern bath and the hygiene and health impacts of wash basins and showers. In Cusco, the SAMBASUR pilot project has proven the sustainability of those improved latrines. It is time to change the technologies for rural sanitation in Peru.

**In dispersed rural areas** the main concern is how to ensure adequate water quality for the population. It will be highly costly and unsustainable to offer piped water to the dispersed rural population. However, it is possible to offer improved water sources, hygiene, and environmental education to the community to improve their health conditions and to offer individual sanitation solutions. Rain water catchments, hand pumps when possible, or a combination of the aforementioned, combined with teaching individual disinfection techniques, could make a difference in improving the quality of life of this poorest segment of the rural population in Peru.

**Recommendation No. 3: Introduce innovative commercial mechanisms for financing access to services,** combining the use of appropriate technologies with innovative ways to make access to water and sanitation services affordable to the poor. This is something that needs to be learned from other sectors like telecommunications. Many households do not connect to a sewerage connection because the lack of a sanitary infrastructure. However, many households in poor peri-urban areas and small towns can afford a cell phone but still do not have sanitary facilities (they can do this because they receive the equipment for free, can have pre-paid calling cards to control their bills, and can get high-quality brand new equipment, to be paid for in 12 to 24 installments). The sector could promote the financing of sanitary facilities by offering the possibility of medium-term financing through the water bill for intra-domiciliary installation and/or equipment as many other utilities do.

**Strategic priority No. 2: Improving investment quality.**

Given the high priority placed by the administration on the water and sanitation sector and the ambitious coverage goals set by the government, large amounts of resources have been allocated to the Water for All Program, the government’s flagship program. It corresponds to the share of the stimulus package or “Investment Shock” for the water and sanitation sector. The following recommendations would help address major existing bottlenecks in the sector and improve the stimulus package’s effectiveness in reaching its overall objective of providing “services for all.”

**Recommendation No. 4: Conduct adequate planning and pre-investment to ensure the quality of the investments.** Even though there is a need to increase coverage and show results in the short and medium term, the sector needs to take into account the decentralization process in the country and use participatory approaches to ensure that new investments respond to high priority needs; good tools for assisting in this are the Integrated Regional Sanitation Plans. It is also important that the government ensures that its resources are allocated to feasible projects that are well prepared and respond to the needs of the communities. Although the development of sound technical designs, adequate environmental and social assessments, and economic or financial analyses for utilities takes some time, eliminating the screening process or delegating it to a level of government without capacity will result in projects that are not adequate, have cost-overruns, implementation problems, high maintenance requirements, or as in many cases in Peru, are soon to be abandoned and collapse (80 percent of PRONASAR’s resources are for the rehabilitation of systems; in many cases small rural communities had sewerage systems that were
never used after installation, and that should never have been built). Regional governments are well positioned to give “feasibility” to projects formulated at the provincial and or district level.

**Recommendation No. 5: Complement infrastructure investments with “software” investments to ensure sustainability.** There is a need to complement important investment in the Water for All Program (*Programa Agua para Todos* – PAPT) with adequate capacity building activities, and to ensure that adequate planning activities take into account needs in terms of sustainable operations and maintenance of the investments. Investment in institutional projects have the objective of providing the necessary support for the improvement and strengthening of the sector, and guaranteeing infrastructure investments that can be of good quality, are sustainable over time, and are environmentally sound. Including adequate hygiene and environmental education to users will ensure that systems yield the expected health impacts of the projects.

**Recommendation No. 6: Make execution more agile and prevent the possible saturation of executing agencies.** The execution of public investments in Peru is still highly complex and bureaucratic. While several of the steps are very important to protect the quality of expenditures, a deep reengineering of the investment cycle would help simplify and optimize execution. Institutional capacity also needs to be strengthened: staff working in the MVCS and DNS is limited, with most working in the main sector’s institutions being consultants paid by the donor community. It is important that part of the emphasis placed by the current administration on the sector is reflected in adequate human resources and budget allocated to sector agencies.

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**Strategic priority No. 3: Improving the performance of EPSs**

The 50 water and sanitation utilities in Peru provide, on average, poor service, compared with service provision in countries like Colombia. It is of paramount importance that the government tackle this problem with adequate resources and provide the right incentives for improving utility efficiency.

**Recommendation No. 7: Central government resources allocated to EPSs should be linked to financial and operational performance improvements.** The government should develop a strict financial policy geared to improving the performance of the utilities, with clear incentives for utilities to concentrate on improving efficiency as a pre-condition for qualifying for investments directed at increasing water production. With estimated average losses of around 40 percent (given the low levels of micro-metering), the VMCS should work closely with SUNASS to monitor and control EPSs, ensuring that enough resources are allocated to performance improvement. Other areas of concern include service continuity. Improvement in commercial and administrative efficiency should also be promoted and monitored from the regions and central government levels.

**Recommendation No. 8: Investments financed by central government should be part of the PMO approved by SUNASS and linked to tariff adjustment to promote financial sustainability of utilities.** Often the good intentions of the central government in subsidizing investments to increase coverage result in the construction of overdesigned infrastructure that sometimes is not even part of the PMO of the utilities, all with negative implications for the financial situation of the utilities. The MVCS should work closely with SUNASS to ensure that financed projects will be financially positive or at least neutral for the EPS.

**Recommendation No. 9: The central government could subsidize leak reduction programs on an output-based basis.** There are good experiences in the region (and elsewhere) with leak reduction programs that hire companies to conduct leak reduction programs paid on results. This type of contract allocates the risks to the third party, and usually has excellent results for the utility. As an incentive for EPSs to participate, the central government could subsidize part of the leak reduction programs contracted on a
Recommendation No. 10: SUNASS should strengthen its control function, closely monitor, or even progressively take over management of those EPSs that cannot provide minimum standards. Often the strict enforcement of service quality standards is also an incentive for utilities to improve their service provision. Public disclosure of utility results and civil society score cards are an important way to put pressure on the utility to improve its services to comply with standards.

Recommendation No. 11. Promote the development of training courses for utility managers and promote peer-to-peer learning. Given the poor performance of the utilities in the country, the VMCS could promote arrangements with local universities for the development of management courses and operational training for utility managers. In many cases, civil or sanitary engineers with little knowledge of business administration are managing EPSs, lacking the basic knowledge to manage a complex utility service.

Strategic priority No. 4: Improving service provision in small towns.

Service provision in small towns is among the worst in the country. In recent years the government has developed pilots that should be expanded to improve services in small towns.

Recommendation No. 12: Stop direct service provision by the municipalities, and scale up successful small town management models. The government should develop programs targeted to promoting the establishment of, at a minimum, a separate unit with independent accounting for the provision of water and sanitation services in small towns. Having this condition met should be a condition for accessing investment resources such as those provided by the PAPT, so that adequate administration, operation, and maintenance of the infrastructure could be guaranteed by a specialized operator (public, private, or mixed). Adequate service management should be the basis to ensure investment sustainability, and investment programs should be properly analyzed and implemented using appropriate technologies.

Recommendation No. 13: Promote multi-village schemes. Whenever possible the government could complement recommendation No. 12 with the promotion of multi-village schemes to generate more efficient management solutions to accrue some additional benefits from the generation of economies of scale.

Strategic priority No. 5: Sustainable provision of rural water and sanitation services.

One of the main problems in the water and sanitation sector in Peru is how to provide sustainable services to the rural population. The following recommendations could help the government expand and improve the quality of water and sanitation services in rural areas.

Recommendation No. 14: Expand the impacts of water and sanitation interventions to the areas of hygiene promotion, sanitary, and environmental education. The following are practical actions that could be promoted by the national government:

1. Sanitary education aiming at modifying behavior patterns to achieve good hygiene habits in the population must be incorporated into all water and sanitation interventions, and lessons from the national hand-washing initiative under the leadership of the Ministry of Health with support from the WB’s Water and Sanitation Program (WSP) should be broadly disseminated;
2. The impacts of water and sanitation interventions are greater when the level of service is at the household level; projects must always include sanitary education components;
3. The costs associated with health promotion could be shared between the different responsible agencies, through formalized agreements with ministries of health, education, and environment; those agreements should be beyond a specific project but be at the national level;
4. The sanitary monitoring associated with water and sanitation services should be incremented to improve the evidence on impact, and thus optimize future investments.

**Recommendation No. 15: Creating and strengthening water user associations in concentrated rural areas.**

The government should continue expanding PRONASAR’s effort at the national level, promoting sustainable rural water supply and sanitation services. It is important to have a participatory project cycle with active community participation in the planning and design phase, where a water user board should be created and trained, to promote community participation in the construction phase, and then to provide technical assistance during the post-construction phase. The central government should promote the active participation of subnational governments (regional, provincial, and district level) in the monitoring and technical assistance to the water boards. Some countries have developed scorecards to monitor the performance of the water user boards and to use the results of the scorecards to customize training and technical assistance to rural boards. Peer learning has also been successfully implemented, allowing the boards to improve through mutual learning. Other countries promote the creation of associations of water boards at the regional/provincial levels and post-construction support and technical assistance is provided by the associations to their boards with successful results. To date Peru needs to pilot some or all of these models and promote some formal mechanisms to provide constant strengthening of the water user associations.

**Recommendation No. 16: Develop mechanisms to improve drinking water sources and individual sanitation solutions to dispersed populations.**

Peru still needs to develop a strategy for improving services to dispersed populations. Appropriate technological solutions for serving dispersed populations need to be scaled up in the county. The MVCS, in close coordination with the regional directions of sanitation, should develop partnerships with the Ministry of Health and/or other rural agencies to monitor the quality of water and develop training activities to teach the dispersed populations the use of disinfecting and/or filtration techniques to individually ensure the provision of drinking water at the household level. The construction of latrines and providing of hygiene, sanitary, and environmental education together with the correct use and maintenance of the latrines will require partnerships at the regional, provincial, and district levels, if Peru wants to achieve a sustained increase in coverage in rural areas.

**Strategic priority No. 6: Treatment and disposal of the wastewater from Lima and coastal cities in the country**

Adequate treatment and disposal of the wastewater of Lima is an issue of utmost importance for the country. After years of unsuccessful attempts, the government is now in a position to award the Taboada submarine outfall contract and thereby resolve an important part of the problem. For coastal cities in developing countries, wastewater disposal by preliminary treatment followed by an effective submarine outfall is an affordable, effective, and reliable solution. It is indeed simple to operate and practically free of negative environmental impacts. Many outfalls are successfully functioning and have a proven track record in many coastal cities all over the world. The strategy should be coupled with a monitoring program beginning prior to and continuing after construction of the outfall to verify the performance of the outfall and to determine if higher treatment levels are necessary. This is a logical strategy for developing countries which would prevent unnecessary investments in costly treatment installations, which cannot be afforded in such countries. Opposition in developing countries to wastewater disposal through a submarine outfall following preliminary treatment (due to requirements for higher levels of...
treatment aimed at achieving higher water quality standards in the sea) will often prevent any progress towards improving wastewater disposal. This is because treatment above and beyond preliminary would render most projects financially non-viable. Avoiding taking steps toward solving wastewater disposal problems is the worst option of all, and usually leaves the most vulnerable population (mostly the poor) in the worst condition. Societies in developing countries need to accept the concept that wastewater disposal by preliminary treatment and a submarine outfall is an excellent start, which is far superior to doing nothing. It has been adopted in most European countries, particularly in the Mediterranean basin.

**Recommendation No. 17: Moving ahead with preliminary treatment followed by a submarine outfall for Taboada and La Chira.** The government of Peru is facing a unique opportunity to make real progress towards resolving the problem of the disposal of the wastewater of Lima, by awarding the Taboada contract to the successful bidder. If this opportunity is missed, it is doubtful that the current government will manage to undertake and complete before the end of its term a new bidding process based on more stringent specifications of water quality standards. In this case, the initiative to successfully resolve the Taboada basin wastewater problem may be postponed for many years.

**Recommendation No. 18: Adopt a gradual approach to discharge standards, supported by strong monitoring of water quality.** As to the conflict of the proposal of the winning bidder of Taboada with the new water quality standard, it is recommended to consider moving in stages, and provide the Taboada project with a waiver that will allow it to achieve the standard which was in effect when the bidding process started. Then, after construction of the project by the winning bidder, study the results and performance of the project, and if warranted, move in a subsequent stage to achieving the more stringent standard.

The same should hold for the La Chira submarine outfall. A waiver should be given allowing development of a project aimed at achieving the previous quality standard and a respective bidding process should be undertaken following the procedure carried out in Taboada.

**Recommendation No. 19: Private initiatives with demand for reuse, should develop their own treatment capacity (if needed) and required infrastructure for reuse.** If demand for any type of wastewater reuse becomes apparent in the area of Lima (or other coastal areas), a portion of the wastewater will be diverted from the outfalls for additional treatment and reuse as required, so that the construction of the outfalls systems does not preclude future reuse. Reuse facilities should be independent from the water and sanitation utility.

**Strategic priority No. 7: Treatment and disposal of wastewater in the rest of the country.**

The problem of low coverage of wastewater treatment in Peru needs to be tackled by the central government. An outline of the proposed strategy for wastewater management in country is detailed below.

**Recommendation No. 20: Follow a strategic approach to wastewater disposal.** Due to scarce resources for the water sector, high priority should be assigned and a budget allocated in order to support cities whose untreated wastewater discharge really causes public health or environmental problems (contamination of critical water bodies or severe contamination of water resources which are used downstream as a water supply source). Cities whose raw wastewater discharge does not cause severe problems (for instance cities which discharge to receiving bodies with high assimilation capacity such as large rivers) should have a secondary priority. The central government should provide subsidies to high priority cities, so as to ensure the implementation of the priority wastewater management schemes. The government should provide support only to cities that accept to adopt an appropriate wastewater treatment process, one from a manual of processes approved by the government. Appropriate technologies for
wastewater treatment means simple treatment processes of proven technology, of low investment costs, and especially of low operation and maintenance costs (much less costly than conventional processes); in addition they must be simple to operate, and with the capacity of yielding any required effluent quantity. Such processes do exist and are especially suited for countries with warm climates. The government should insist on such processes to save on investments and to avoid supporting costly and complicated processes, which will be abandoned after construction due to complexity and high operation and maintenance costs.

The government needs to ensure that a sustainable institutional setup is in place in the cities that receive support so as to ensure that the constructed treatment installations will be put in operation and will be properly operated. When necessary, institutional adjustments should be included in wastewater projects.

The wastewater management scheme should be developed in stages, while taking into account in the first stage the assimilation capacity of the receiving body (using water quality simulation models), thereby ensuring that even during the first stages no environmental nuisance is caused. This is usually a feasible task.

A comprehensive water quality monitoring program should be put in place prior to and following the construction of the treatment installations.

If monitoring results demonstrate that no environmental problems are caused after the first stage, a delay or abolishment of construction of subsequent stages should be considered, so as to prevent unnecessary investments and operation costs.

If the monitoring of results demonstrates that environmental nuisance persists, then implementation of the subsequent management stages should be undertaken.

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<th>Strategic priority No. 8: Institutional strengthening of sector institutions and improved sector governance.</th>
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Peru’s current government has demonstrated a substantial level of political will towards the sanitation sector, giving it a level of priority unseen in the previous years. The sector reform is already underway, with the publication of new norms that seek to put in order the service management through un politicized and professional structures. These norms include the change in the EPS boards, modifications in the tariff increment approvals, setting up of contracts with EPSs, good corporate governance norms, and guidelines for the creation of new municipal management units, among others. Having specialized human capital, at all levels, is the foundation to ensuring the satisfactory running of the sector. The establishment of the structure to allow training of professionals and technical personnel must be included in the sectoral priorities, and resources must be allocated to that end.

Recommendation No. 21: Institutional strengthening of the VMCS and DNS. Consistent with the priority given by the current administration to investments in the sector, the government should give to the national ruling organization ente rector the adequate human and budgetary resources to ensure that the sector could develop into a strong and efficient sector consistent with the aim of the government. The DNS should be able to coordinate with and strengthen the regional directorates of sanitation so that the regional authorities are able to perform their duties in an optimal manner. Most of the technical staff at the VMCS are consultants and many are paid with international funding. Resources should also be assigned for the adjustment to the current legal and regulatory framework.

Recommendation No. 22: Strengthen SUNASS and the regulatory framework. This is for promoting the
adjustment of the regulatory framework, in particular in terms of developing adequate mechanisms to regulate small service providers (those specialized operators that the government should be promoting for small towns) in a hands-off manner. The focus should be on control and enforcement, and on existent regulations effectively regulating sector operators to a level consistent with Peru’s economic development. The strengthening of SUNASS staff training to regulate private companies should also be included.

The regulatory framework has shown weaknesses for the regulation of both public and private companies. The financial situation of a large number of companies is on the border of collapse, requiring urgent action to reverse this situation. This context leads to a deficient service provision, generating lack of interest in water resources and services among the population. The issue of the environment is widely mentioned; however, the related costs to the protection of the environment and the associated responsibilities are not clearly defined. In a competitive scenario, quality of water and environmental protection are issues that should be considered as key in the valuation of the products. The legal framework associated to this issues needs to be updated, and requires negotiation with other sectors, mainly Health, Production, and Environment.

**Recommendation No. 23: Development of the Sector Information System.** Efficient sector planning depends on accurate information about the situation of existing infrastructure and its management at the national level. While the design of a Sector Information System is underway, it is necessary to assign the financing required for its continuous updating, particularly with local data and information.

**Recommendation No. 24: Regional plans to support the urban business and non-business sector, and the rural sector.** Incentives should be considered for the regionalization of water and sanitation services, communication among specialized operators for service provision, and the creation of technical assistance entities at the regional level, as an instrument for sustainable improvement of the sector.

**Recommendation No. 25: Consolidate the legal framework.** The legal framework — despite its improvements over the last decade — is still, for the most part, not in line with the involved costs and necessary capacities for implementation. The large number of existing norms and procedures make implementation confusing and difficult. There are voids in the legal framework that will require an effort from the different government agencies, and more detailed studies, in order to produce effectively applicable instruments. The negotiations made so far have proven to be insufficient to overcome these obstacles.

**Recommendation No. 26: Institutional strengthening of the EPS (see strategic priority No.3).** This is strongly related to the modernization of the EPS in terms of management and operation. The necessary resources include the renovation of institutional procedures, staff training, software implementation, technology equipment, improvement of offices, etc. To avoid some of the past problems, these resources should only be implemented in EPSs and municipalities in which there are commitments to comply with other efficiency requirements such as management through specialized operators, along with the necessary infrastructure investments. In terms of governance, in spite of the legal framework modifications, political interference in the management of EPS is still present. SUNASS demands a high level of management based on efficiency criteria, that is hardly complied with under the current conditions. Only some EPSs use the planning instruments, and the others, due to limited capacity, are excluded from the process.

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99 In the 1990s, the National Water and Sewerage Program (*Programa Nacional de Agua Potable y Alcantarillado, PRONAP*) implemented an institutional and operational strengthening program, but the results were questionable.
Recommendation No. 27: Develop a sector-wide training program. It is necessary to consider capacity strengthening at the central, regional, and local levels. Training of specialized human resources must include capacity building in management, regulation, design, construction, operation and maintenance, in the different hierarchy levels: directive, professional, and technical. Possible tools for this can be the establishment of cooperation agreements with other countries, and agreements with the Education sector for the creation of the mechanisms to train human resources. For the technical level, the development of specific training in an institution such as SENATI (National Service of Industrial Works Training) could generate very good results. Internships at national companies could also be a viable alternative for specialized human resources training. There is a need to formulate instruments to guarantee the presence of trained personnel at all levels. It is evident that the existence of an efficient and competitive structure, with an appropriate remuneration in the sector, would answer this requirement, generating the means and creating the conditions for results. Until this stage is reached, it is necessary to provide the incentives to the companies to achieve this end.

Strategic priority No. 9: Development of consistent sector policies.

Currently the central government is implementing several projects with different and in some cases inconsistent policies. While the Rapid Impact Measures Program requires EPSs to implement a series of measures to improve performance before receiving loans to finance investments, the Water for All program is ready to finance many infrastructure works without any conditionality from the EPS. In rural areas and small towns, PRONASAR implements projects in conjunction with a series of social and capacity building activities while the Water for All program finances investments with no required actions. SUNASS uses the PMO to set tariffs and in some cases the Water for All Program can finance investments that are not part of the PMO. The following recommendations could help the government in developing consistent sector policies, especially uniform financial policies for every market segment. The lack of systematized information on the current situation of the water and sanitation services makes the formulation of far-reaching programs very difficult.

Recommendation No. 28: Develop a uniform financial policy and a transparent allocation mechanism based on performance, to provide incentives to service providers. The VMCS should develop consistent sector policies. The most important of which is the financial policy, given the decentralized nature of the sector and the large amount of resources available. Unified financial policies should integrate specific standards concerning the size of the provider (requesting larger efforts and better performance to larger utilities), in coordination with SUNASS. Consequently, EPSs, including SEDAPAL, can have clear rules for accessing central government resources. In that regard, the Brazilian government successfully developed the Water Modernization Program in which the central government established clear rules for accessing federal resources, with excellent results in terms of utility efficiency and coverage. It is important to promote transparency so that every EPS has the same opportunities to access government subsidies. The allocation mechanism could take into account, besides the poverty level, other indicators such as working ratio and operational performance, providing a larger proportion of resources for investments in those utilities that have been able to reduce costs, increase collection rates, reduce losses, and increase cost-recovery.

Recommendation No. 29: Promote co-financing to increase amount of resources to the sector by leveraging subnational resources and supporting policies established by the central government. The central government, through the VMCS, could promote the sector by working closely with regions and municipalities in the formulation of the Integrated Regional Sanitation Plans. The government can promote co-financing from subnationals, using already existing programs generated by the DNS like the Water for All program. In this way, not only can the central government leverage additional resources to the sector, but it can also ensure that subnationals invest their resources in good projects consistent with
central government policies, while also ensuring that central government resources are directed to prioritized projects identified in the Integrated Regional Sanitation Plans.

**Strategic priority No. 10: Promotion of PPPs.**

The VMCS relies on private sector participation as a tool to improve management in EPS; however, the final decision is in the hands of the provincial governments, and to date the acceptance of this management scheme has been very low. In small towns, the constituting of the municipal management units, and the operation through specialized operators, has been implemented recently and on a small scale, leaving the sustainability evaluation for the future. The government is also relying on private initiatives for the development of larger infrastructure works, which offer a reduced turnaround time but may not be offering the government the best designs and project options, and might not be tackling the priorities identified in the PMO of the EPSs.

**Recommendation No. 30: Private investment promotion.** This should be a part of institutional investment, aiming at disseminating and promoting the benefits of private sector participation in sanitation companies. It includes the training of mayors and authorities in the different modalities of private sector participation and partnerships. It will be important to show that PPPs are not a “privatization” but a way to combine efforts to improve services. It is also important to learn to manage the expectations of the population, to understand that the private sector could improve the services delivered but that it won’t happen overnight.

**Recommendation No. 31: Foster PPPs for improvement of specific performance needs and/or to improve operational efficiency, beyond DBOs and DBOTs.** The MVCS should more proactively promote PPPs in which the government takes the lead in requesting specific results from the private sector. Even though this approach requires more preparation time, experience from Chile and other countries clearly show that a well prepared transaction reduces implementation problems. It is also important that the current administration not only focuses on the Lima region, where for the moment three out of the four processes will take place (if Taboada and La Chira are successfully awarded).

**Recommendation No. 32: Explore the options of developing OBA schemes.** An interesting experience that could be replicated in Peru is the Output Based-Aid (OBA) approach, which has been successfully piloted in Honduras, Paraguay, and other countries, through which the government can have a better targeting of subsidies and can ensure the expected results through the payment which is an excellent incentive to deliver. This mechanism could be designed for small towns and other urban areas for coverage expansion but also for rehabilitation and/or to promote performance improvements like reduction of unaccounted-for water by paying a fee based on the achievement of agreed targets.

**Box 8-7 - Paraguay: Output-Based Aid (OBA) subsidy scheme in the rural water and sanitation**

*The context* – The government piloted an OBA financing scheme for water and sanitation services in rural areas. SENASA was exploring mechanisms to meet demand and to comply with its expansion targets in a more efficient and cost-effective manner and decided to explore partnerships with the private sector and local communities. With the support of a World Bank loan, the first output-based subsidy scheme was in the water and sanitation sector.

*The OBA financing scheme* – Three successive rounds of bidding were organized in 2002, 2004, and 2005, resulting in the awarding of six contracts to construction companies associated with Aguateros. OBA financing was provided in the form of a subsidy per each new connection made in the service area. In the first round of bidding, the selection criterion was the connection cost for the end consumer (based on a fixed subsidy amount of US$150 per connection). The successful bidder won the bid by setting the connection cost at between US$200 and $217 per connection, equivalent to 40 percent of the total estimated cost of each connection, if the contract was for the construction of the connections. In the second round of bidding, the entrepreneurs had to compete on the amount of subsidy they would request from the government (taking account of a fixed connection cost of US$80 for domestic consumers as well as pre-determined tariff levels), thereby shifting the bidding risk from the final customers to SENASA. Operators were
Strategic priority No. 11: Support the decentralization process

Decentralization of resources has not been accompanied by the strengthening of the subnational entities, which generates risks of low sustainability of the investments. Experiences and lessons learned from projects around the country are not replicated at the national level, as expected. There is low coordination between the central, regional, and local levels. The absence of a sector information system makes planning and resource allocation difficult tasks. This weakness is accentuated in the small urban areas and in the rural sector, as long as SUNASS maintains an updated information system for the EPS.

Recommendation No. 33: Strengthen regional planning.

(See recommendations No.1, 24 and No. 29 above).

Recommendation No. 34: Complete the separation of functions within the sector, including the development of a transition period to decentralize SEDAPAL. Given the current situation of SEDAPAL it is not clear why the central government wants to maintain control over SEDAPAL, if according to the law, service provision is a responsibility of the local governments. It is important that a transition period is established in which the central government will pass its shares on SEDAPAL on to the corresponding subnational governments. The regional government and municipalities should be the ones prioritizing investments and not the central government.

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Strategic priority No. 12: Adapt to climate change

Recommendation No. 35: The sector should take a proactive approach to climate change by promoting sound adaptation measures. The PMOs of the EPSs should clearly identify the actions that are needed to adapt to the expected effects of climate change in order to be prepared for periods of scarcity and/or flooding. Dissemination of lessons learned and the active participation of the DNS in all climate change activities will be important. Climate change possesses a high risk to many utilities that are closely linked to glaciers for their water source and those in flood-prone areas. So far the sector has not paid enough attention to this important risk.

Recommendation No. 36: Scale up pilot projects developed in the GEF-SCCF, Rapid Glacier Retreat Project in other sensitive watersheds in the country. The national government should be closely following the experiences in the Mantaro and Vilcanota River Basins so that this experience could be replicated. The Regional Integrated Sanitation Plans as the PMOs should include adaptation measures to climate change.

Recommendation No. 37: Promotion of the value of water. Together with communities, aim toward valuing water and sanitation services to preserve its use and promote a payment culture, fundamental to achieving the financial sustainability of the companies, municipal management units, and/or water user boards. This concept already has been incorporated in the projects implemented by PRONASAR in rural areas and small towns. However, it should also be extended to the urban areas.
CHAPTER 9 : SECTOR PERSPECTIVES: ELECTRICITY

OVERVIEW

General sector status

Peru is favored by abundant indigenous sources of energy, mainly hydroelectric and natural gas. Although there is no solid basis for estimates of the technical potential of hydropower in Peru, because of the lack of updated inventories of such resources, a serious study carried out in 1979 by a German technical assistance program\(^\text{101}\) indicated potential annual hydropower production in the country of about 400,000 Gigawatts-hour (GWh). The other important indigenous energy resource is natural gas. The proven reserves are on the order of 11.8 TCF,\(^\text{102}\) about 5.3 percent of the proven reserves in South America (of which Venezuela has 68.5 percent). Camisea, located in the central eastern part of the country, in the Amazonian region of Cusco, is the largest field. Actual estimates of internal consumption of natural gas indicate that the present proven reserves could last for about 35 years. Considering LNG (Liquefied Natural Gas) exports, the period is reduced to about 20 years.

The following figures could help summarize the general picture of Peru’s energy and electricity sector:

- Population: 28 million (2007 census)
- GDP per capita: US$4,345 (year 2009)
- Annual Electricity Production: 30 million of MWh (megawatts-hour, year 2009)
- Average annual per capita electricity consumption: 963 kWh (kilowatts-hour, year 2009)
- Average monthly household electricity consumption: 80 kWh (year 2007)
- Percentage of population with access to electricity: 79.5 percent overall (32 percent rural)\(^\text{103}\)
- Average retail electricity tariff to residential consumers: 9.1 US cents per kWh (year 2007)
- Average daily petroleum production: 113,870 barrels (almost 25 percent increase since 2003)
- Average daily natural gas production: 259 million cubic feet (50 percent increase from 2006 and more than three times the production since the Camisea field started production in 2004)

The power sector in Peru was reformed and restructured between 1991 and 1993, followed by a privatization and concession process. As a result, a modern legal and regulatory framework was established in the Electricity Concessions Law (ECL) of 1992–93\(^\text{104}\). Ownership of major sector assets were transferred from public to private hands, together with the management and operation of the main electricity facilities. The established legal framework also stipulated the methodology for rate setting, the granting of concessions, customer service guidelines and accountability of the operators, plus changing the role of the state from owner and operator to policymaker, rule maker, and regulator.

As shown in Figure 9-1, during the initial years after the reform of the electricity sector, investments in generation, transmission, and distribution increased year after year, reaching a peak of about US$760

\(^{101}\) Evaluation of the National Hydropower Potential of Peru, Lahmeyer-Salzgitter-MEM (1979)

\(^{102}\) Trillion Cubic Feet: 10\(^{12}\) cubic feet

\(^{103}\) The 2009–2018 National Plan for Rural Electrification (DGER 2009) includes increase rural electricity coverage from 30 percent (in late 2007) to 69 percent in the medium term (2011) and 84 percent in the long term (2018).

\(^{104}\) The Electricity Concessions Law (ECL) and its regulations; Law N°25844 and Supreme Decree (DS) N°009-93-EM
million in 1999, followed by a drastic drop lasting until 2003 when it totaled only about US$230 million. By that time, sector authorities and the government were concerned by this reduction in investments and the resulting lower reserve margin of the system. This was compounded by an extended dry period during 2003 and 2004. As a consequence, in June 2005 the executive branch proposed to Congress a complementary electricity law to address the problems. In July 2006, Congress passed Law No. 28832 to “Ensure the Efficient Development of Electricity Generation.” This new law introduced important changes to the ECL, mainly regarding generation and transmission regulation, the administration and functioning of the electricity market, and the determination of electricity prices.\footnote{The most important changes introduced in Law 28832 were: (a) in generation, the establishment of an obligatory competitive auction mechanism to contract the supply to distribution companies; (b) in transmission, the formalization of transmission planning and a bidding process for building and operating the required system transmission expansion resulting from the planning; (c) changing the composition and governance of COES (Commission for Economic Operation of the National Interconnected System) with the introduction of distribution companies and large users as new members; and (d) on prices, in generation the passing through of auction prices as part of the regulated generation tariff, and the stability of the transmission remuneration for existing facilities, and transfer of the results of the bidding process for new facilities.}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure9-1.png}
\caption{Overall investments in the electricity sector 1995-2007 (in millions of US$)}
\end{figure}

\textit{Source: Author’s calculations based on OSINERGMIN and MEM}
particular, in the rural and remote areas. In 2008, about 5,700,000 people, mainly in the predominantly poor rural areas of Peru, did not have access to electricity. Although the official figure for the overall electrification coverage in the country is 79.5 percent, it hides the disparities between the different regions: one can find a region with less than 40 percent electrification (Cajamarca) and other with nearly 100 percent (like Lima).

There is a close correlation between the rural population in a region and electrification coverage, as can be appreciated by looking at Figure 9-2, depicting the relation of electrification coverage versus the percentage of the rural population in relation to total population, in each region. Although there are some particular cases (like Huancavelica, or some regions in the rain forest, like Loreto and San Martín), the correlation is quite good. This confirms the fact that it is much more difficult, and thus costly, to reach disperse, remote rural areas to provide electricity service. Although the Peru’s rural electrification rate was one of the lowest in Latin America with 32 percent of coverage for rural areas, an ambitious plan is being implemented to expand the service. The 2009–2018 National Plan for Rural Electrification (DGRR 2009) includes increase rural electricity coverage from 30 percent (in late 2007) to 69 percent in the medium term (2011) and 84 percent in the long term (2018).

![Figure 9-2: Correlation of electrification coverage and rural population](image)

*Source: Author’s calculations.*

**Present situation and future challenges of the sector**

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106 INEI’s 2007 census indicates a figure of only 75 percent of the population having access to electricity public service. The Ministry of Energy and Mines (MEM; also MINEM) figure of 79.5 percent is based on internal estimations from rural electrification projects and the reported electricity users of distribution companies.

107 The latest information on poverty from the official statistics institute, INEI, indicates that at 85.7 percent Huancavelica has the largest poverty index, followed by Ayacucho (68.3 percent) and Puno (67.2 percent).
Electricity production and demand has been steadily growing since sector reform in 1992-1993. Electricity generation in 2007 was 28,133 GWh (not including self-generation/consumption), of which 68 percent came from hydro resources (down from 2003, when the hydro production represented 85 percent of all generation.) Consumption in 2007 was 24,621 GWh, of which 24 percent represented residential, 18 percent commercial, 55 percent industrial, and 3 percent other consumption (mainly public lighting.) Electricity consumption has grown on average by 6.94 percent in the last five years. The increase of consumption in 2007 with reference to 2006 was 10.5 percent, and the partial numbers for 2008 show a similar increment compared to 2007. Peak power demand has evolved with a similar tendency as energy. The peak demand for 2007 was 3,966 MW, with an increase of 10.8 percent compared to year 2006.

Given that no significant new generation was expected until 2009, and that peak demand for 2008 is estimated to have reached a level of about 4,350 MW (a 10 percent increase from 2007), 2008 was a critical year for electricity supply with a very low reserve margin of only 16 percent with respect to the firm power capacity of the system during the dry season. This level of reserve is considered inadequate for a mostly hydro-dependant system. Private sector investments in generation have been lower than expected and implementations of some projects have been delayed. Apparently there is no solution in sight in the short-term, and a real risk of power cuts or service limitations exists.\(^{108}\)

If the planned new electricity generation comes as expected in 2009, some 590 MW of gas-fired thermal units, and about 230 MW of hydropower, will provide the necessary additional power capacity to cover the expected demand and increase the reserve margin to a more comfortable level of 30 percent. If the recent past is an indication, new investments in the sector, mainly by the private sector, which is the driving force in this case, have been very cautious and often well below the requirement, or produced with considerable delay. A generalized complaint of the private sector is that the present levels of electricity tariffs do not provide attractive returns to new investments in the sector.

The major changes introduced in Law 28832 required extensive detail regulations, which up until now have taken nearly two years, and still have not been fully completed. One example of a missing important piece of regulation is for long-term supply auctions, which would allow the construction of new power plants, in particular hydroelectric generation. Pressured by recent rapid growth of electricity demand and some restriction on supply, MINEM\(^{109}\) has been very active in trying to prevent a potential supply crisis, proposing additional “promotional” legislation, like: adjusting operational dispatch to induce the conversion of open cycle gas units to combine cycle; using price premiums for renewable sources of electricity generation; offering price discounts to new hydropower plants when competing with thermal units in supply auctions; authorizing public-owned generating companies to hire or buy emergency generating units, etc.

The government has taken action to prevent any possible power shortage, passing an emergency decree\(^{110}\) which allows public-owned sector companies to acquire the necessary generation capacity if required. The cost of this generation will be incorporated in the electricity tariff, but its marginal cost will not be

\(^{108}\) In August 2008, during two consecutive days, and for the first time since sector reform, the electricity system suffered power cuts of significant magnitude, signaling the seriousness of some system limitations. Parts of the transmission system are congested and hydroelectric generation has been particularly low. These problems have been compounded with capacity limitation in the last section of the Camisea gas pipeline, where most of the gas-fired electricity generation is located.

\(^{109}\) Ministry of Energy and Mines; MINEM or MEM

\(^{110}\) Emergency Decree N°037-2008 of August 21, 2008 to “Ensure in a Timely Manner the Electricity Supply to the National Interconnected System”
considered when determining the system’s marginal cost (it will not affect the price of transactions in the spot market). Electricity tariffs increments will be different depending on the type of user, in proportions of 1, 2, and 4 for retail regulated users, small non-regulated users, and large users, respectively.

Although the decree has a temporary application period of three years, and it is recognized as a necessary government response to a potential critical situation in the sector, it is also true that it is the first time of a direct public intervention in the sector that affects some basic principles of the 1992-1993 reform. What should become clear is that the Peruvian energy sector will face a difficult challenge in the coming years in coping with the increased demand resulting from its important economic growth and the necessity of a fresh look at sector structure and model.

**TARIFFS/PRICING, QUALITY, AND EFFICIENCY**

In this section we are going to examine the tariff/pricing system of the electricity sector and some of its quality and efficiency characteristics. The Peruvian electricity tariff/pricing scheme is designed on the basis of full-cost recovery in providing the service in each of the three segments, the generation, the transmission, and the distribution systems\(^{111}\). Another important characteristic of the tariff scheme is that supply charges and payments to and from final users and between wholesale market participants are based on a two-part tariff system of capacity and energy charges.

**Tariffs/Prices**

The generation tariff/price is determined differently if electricity supply is for large or for retail/small users. In the first case, prices are the result of bilateral free negotiations between generators and large users. The generation tariff for small users is regulated.

The generation regulated energy price is determined by the regulator (OSINERGMIN\(^{112}\)) every year, according to the expected evolution of demand and generation supply capacity, fuel prices, competitive generation auction prices and other economic parameters (like price indexes and inflation)\(^{113}\). Real-time dispatch of generation supply is carried out by COES\(^{114}\), following a cost-based merit order procedure, independently of any bilateral contracts or the results of generation auctions. Hourly (in reality every 15 minutes) transactions between generators, distribution companies, and large users in the wholesale market are done at the “marginal/spot” price (of last unit in the dispatch merit order). The wholesale market is in reality a “differences market” of quantities contracted (bilaterally or through auctions) and “demanded”

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\(^{111}\) It should be recalled that tariffs applied only to regulated electricity users, those with demands below one Megawatt. Large users have no electricity tariff; they contract supply at free-negotiated prices with generators or distributors.

\(^{112}\) Supervising Agency for Investment in Energy and Mining

\(^{113}\) The reference-regulated “busbar” energy price is calculated by the regulator as the average marginal energy cost of the system, based on a three-year operation simulation (of the historical previous year and the next two prospective years). This reference price is weighted with the prices resulting from the supply auctions to obtain the final energy busbar price applied in the tariffs. At present, 65 percent of the regulated energy price comes from auctions and 35 percent directly from the reference busbar price (resulting from supplies with direct contracts or without contracts).

\(^{114}\) Spanish acronym for Comité de Operación Económica del Sistema Interconectado Nacional (Commission for Economic Operation of the National Interconnected System)
by the dispatch. COES also manages the wholesale market, establishing payment obligations between

generators, large users, and distribution companies, in accordance with individual balance of energy

dispatch.

The capacity payment is based on the annualized investment and O&M costs of a peak-load generation

unit, of “adequate capacity in relation to the size of the system and the reserve requirements” (this

quantity is called “base price of power” in the regulations). The regulator determines the main

characteristics of this unit each year, for application in the periodic review of generation tariffs. The

present reference peaking unit is a 175.6 MW open-cycle natural gas-fueled unit (reference investment

requirement is taken from statistics of last five years published by *Gas Turbine World*).

The transmission and sub-transmission networks have open access, and tariffs are regulated under an

economic cost-based procedure. Transmission requirements are determined in periodic transmission

plans. The results of competitive biddings to implement the recommended transmission facilities in the

plans are used as input to determine transmission tariffs. Transmission tariffs are recalculated every year.

The distribution tariff (*Valor Agregado de Distribución*, or VAD), is regulated under a cost-based

efficient model company, for each of five “typical distribution sectors” (urban high density; urban

medium density; urban low density; urban-rural; and rural). The VAD for the different zones and

distribution companies are recalculated every four years. The tariff for a typical regulated final user

consists of: the generation tariff (*G*_T) + the transmission tariff (*T*_T) + the distribution tariff (VAD).

In Figure 9-3 one can see the 2007 tariff structure that applies to regulated final users. The generation part

(capacity and energy) represents 51 percent of the tariff, transmission 12 percent, and distribution 37

percent.

**Figure 9-3: Structure of the 2007 total tariff to regulated final users**

As indicated in the section on the structure of the market, in 2007 the demand of the unregulated (“free”)

large users represented 46 percent of total demand. This large market has no generation tariff, negotiates

electricity quantities, and prices directly with suppliers (generators or distributors).

**Table 9-1** shows the evolution of the average electricity tariff to regulated users and the average

negotiated price by “free” large users during 1995-2007. It is important to mention that many large users
do not pay distribution charges because they are connected to the high voltage network; therefore part of the noticeable difference in tariffs in the table is explained by this situation\textsuperscript{115}. It is also worth noting that the average tariffs and prices have varied in a narrow band of two cents of US$ per kWh in the entire period of 13 years.

In the operation of the generation wholesale market, two price parameters are important: (a) the marginal ("spot") energy price used by COES to balance "transactions" between generators, and (b) the "busbar"\textsuperscript{116} energy tariff calculated by the regulator every year, based on a three-year economic operation simulation, combined with the price results of supply auctions carried out by distributors. Distribution companies pay to generators the energy supply used by the regulated market at the regulated generation energy tariff.

<table>
<thead>
<tr>
<th>Year</th>
<th>Regulated</th>
<th>Large Users</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>10.1</td>
<td>5.1</td>
<td>8.4</td>
</tr>
<tr>
<td>1996</td>
<td>10.4</td>
<td>5.3</td>
<td>8.6</td>
</tr>
<tr>
<td>1997</td>
<td>10.1</td>
<td>5.4</td>
<td>8.2</td>
</tr>
<tr>
<td>1998</td>
<td>8.8</td>
<td>4.9</td>
<td>7.1</td>
</tr>
<tr>
<td>1999</td>
<td>8.3</td>
<td>4.9</td>
<td>6.8</td>
</tr>
<tr>
<td>2000</td>
<td>8.8</td>
<td>5.2</td>
<td>7.2</td>
</tr>
<tr>
<td>2001</td>
<td>8.8</td>
<td>4.7</td>
<td>6.9</td>
</tr>
<tr>
<td>2002</td>
<td>8.3</td>
<td>4.7</td>
<td>6.6</td>
</tr>
<tr>
<td>2003</td>
<td>8.4</td>
<td>4.6</td>
<td>6.6</td>
</tr>
<tr>
<td>2004</td>
<td>8.7</td>
<td>5.2</td>
<td>7.0</td>
</tr>
<tr>
<td>2005</td>
<td>9.4</td>
<td>5.6</td>
<td>7.6</td>
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<tr>
<td>2006</td>
<td>9.2</td>
<td>5.6</td>
<td>7.5</td>
</tr>
<tr>
<td>2007</td>
<td>9.1</td>
<td>5.4</td>
<td>7.4</td>
</tr>
</tbody>
</table>

\textit{Source: Author’s calculations based on OSINERGMIN and MEM}

The marginal energy price is a continuous fluctuating value determined by the operating cost of the most expensive (the last) generating unit needed to cover the peak power demand of the system at a specific moment. For example, in Figure 9-4 (in red) a typical relation of the cumulative generation capacity (in the $x$ axis) is depicted, ordered according to increasing operational cost of generating units (in the $y$ axis)

\textsuperscript{115} As indicated in Figure 9.56, 63 percent of the electricity tariff to regulated users in 2007 (or 5.7 cents of US$ per kWh), accounts for generation and transmission. This value compares closely with the electricity price to large users indicated in Table 9.58.

\textsuperscript{116} The term “busbar” is commonly used in the power systems field to refer to the network nodes of the transmission grid (usually the main substations of the system). Generation prices are calculated for each of the main nodes (the difference in prices between nodes are the result of transmission losses). If no specific node is mentioned, usually prices refer to Santa Rosa, the main node located in Lima.

\textsuperscript{117} It should be noted that in 1998 there was a noticeable reduction of the annual average tariff as a result of the first four-year recalculation of distribution tariffs after privatization, which was done at the end of 1997 and started application in 1998.
for the dry season in 2007 (and most probably also valid for 2008, because there are no new hydroelectric units coming into operation this year).

As can be seen, the cost of generation is zero up to the hydropower capacity of 2,390 MW, and then the cost starts to increase as thermal plants are needed to cover the demand. Up to 3,500 MW of demand, the marginal operation cost is just over US$10/MWh, and then between 3,500 and 4,000 MW (just above the 2007 peak demand) the cost increases from 10 to about US$60/MWh. For similar conditions of generation in 2008, for the estimated peak demand of 4,255 MW, the marginal generation operational cost would be about US$130/MWh; more than double that of 2007. For reference, the 2007 average regulated energy price (tariff) is also shown in green (with a value of US$30/MWh).

The marginal cost curve (in red) is not static. If in a given day there is one generating unit out of service (due to maintenance or because of a forced outage), the portion of the curve corresponding to the power capacity of the unit has to be taken out, and the remaining portion of the curve moved to the left to close the gap. For example, if combine-cycle units 3 and 4 of Ventanilla were forced out of service by some kind of contingency (like problems with the supply of natural gas, as happened in August 2008), the portion of the marginal cost curve between 2,917 and 3,410 MW (493 MW), corresponding to these units, had to be taken out.

**Figure 9-4: Curve of generation energy price vs. power demand for dry season**

![Dry Season Energy Price vs. Power Demand](image)

*Source: Author’s calculations based on OSINERGMIN and COES*

It can easily be appreciated that displacing the marginal cost curve in 493 MW to the left will produce an increase in the marginal cost of the system to all demands above 2,917 MW. In this case, instead of the US$60/MWh marginal cost to cover the peak demand of 2007, in normal conditions, the cost will jump up to about US$205/MWh, more than three times. Even worse, if some of the other units were not available to replace the lack of these 493 megawatts, some power cuts would be needed.
Because of the highly fluctuating nature of the marginal cost, it is a standard practice to use for comparisons daily, weekly, monthly, or annual averages instead. \(\text{Table 9-2}\) shows the annual maximum, minimum, and average energy generation marginal cost of the system for the period 1998-2007, and also as a reference lists the (busbar) energy tariff. As can be seen, since 2003 the marginal cost has started an important increasing trend, reaching a record high of almost US$150 per megawatt-hour in 2006. It is also important to notice that values of average marginal cost and regulated tariff were not much different from 1998 to 2002, but from 2003 onward the regulated generation energy tariff has been much lower than the marginal cost.

\[\text{Table 9-2: Annual average marginal energy system costs 1998-2009}\]

<table>
<thead>
<tr>
<th>Year</th>
<th>Marginal Price in Cents of US$ per kWh</th>
<th>Tariff</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher</td>
<td>Lower</td>
</tr>
<tr>
<td>1998</td>
<td>35.53</td>
<td>10.80</td>
</tr>
<tr>
<td>1999</td>
<td>33.64</td>
<td>5.93</td>
</tr>
<tr>
<td>2000</td>
<td>37.44</td>
<td>5.81</td>
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<tr>
<td>2001</td>
<td>39.18</td>
<td>7.30</td>
</tr>
<tr>
<td>2002</td>
<td>51.23</td>
<td>10.34</td>
</tr>
<tr>
<td>2003</td>
<td>65.89</td>
<td>11.14</td>
</tr>
<tr>
<td>2004</td>
<td>112.39</td>
<td>23.94</td>
</tr>
<tr>
<td>2005</td>
<td>98.81</td>
<td>21.85</td>
</tr>
<tr>
<td>2006</td>
<td>149.81</td>
<td>24.06</td>
</tr>
<tr>
<td>2007</td>
<td>65.45</td>
<td>25.00</td>
</tr>
<tr>
<td>2008</td>
<td>235.38</td>
<td>17.39</td>
</tr>
<tr>
<td>2009</td>
<td>65.7</td>
<td>17.24</td>
</tr>
</tbody>
</table>


As shown in \text{Table 9-2}, the year 2007 had lower marginal costs than the previous three years, with values similar to 2003 in nominal terms. This decreasing trend continued during the five first months of 2008 (see Table 9-3), but the problems started in June with a jump of three times in the marginal cost of the previous month, reaching a historical monthly record high of US$157.37 per megawatt-hour.

\[\text{Table 9-3: Marginal price and tariff (Jan-Jun 2008)}\]

\[\text{\footnotesize 118 Marginal costs are registered every 15 minutes for purposes of balancing transactions, therefore in a single day there are 96 values, and in a year 35,040 values.}\]

\[\text{\footnotesize 119 This situation was one of the major factors that forced some generation companies to refuse contracting electricity supply to distribution companies for the regulated market; and the regulatory changes in 2006.}\]
### Subsidies

The Peruvian electricity tariff scheme was initially designed for full-cost recovery; therefore there were no explicit subsidies or cross-subsidies to the electricity rates. In 2001, legislation was announced for establishing a “social tariff” for electricity consumption (*Fondo de Compensación Social Eléctrica; FOSE* for its initials in Spanish), starting its application in November 2001, with a temporary duration of three years.

In July 2004, the Congress extended indefinitely the application of the subsidy and increased its level. The current FOSE subsidy to households with monthly consumptions of up to 30 kWh consists of: (i) a 25 percent tariff reduction for urban users supplied by the interconnected system; (ii) a 50 percent tariff reduction for rural users supplied by the interconnected system, or urban users supplied by isolated systems; and (iii) a 62.5 percent tariff reduction for rural users supplied by isolated system. For monthly consumptions between 31 and 100 kWh, the tariff reduction is gradual, from a maximum of 60.5 percent to a minimum of 7.5 percent, for rural users supplied by isolated systems, and for urban users supplied by the interconnected system, respectively. Users with electricity consumption above 100 kWh per month pay the FOSE subsidy, which represents an approximate 3 percent increase in their regular tariff.

Statistics indicate that 58.4 percent of households (about 2.63 million electricity service users) are beneficiaries of FOSE, of which only about 600 thousand are non-urban users (23 percent). The FOSE cross subsidy represented US$26.3 million in 2007.

In addition to the FOSE, the Law N°28832 of July 2006 (to “Ensure the Efficient Development of Electricity Generation”) introduced a new provision, whereby electricity users being served through the national interconnected system provide, by way of an increase in their electricity tariffs, financial support to users connected to isolated systems, to reduce the generation costs of such systems. The estimated amount to be transferred through this mechanism is in the order of US$22 million per year.

A similar amount of US$22 million per year is also provided by the indicated law to finance investments in rural electrification projects. In summary, a total of about US$70 million annually is provided as cross-subsidy from urban users, with monthly consumption higher than 100 kWh supplied from the national interconnected system, to the rest of the users (mostly “poor” urban and rural users).

### Quality and efficiency

At the beginning of the 1990s the power sector was in a crisis with large power cuts and a high level of...
losses in the distribution system. As depicted in Figure 9-5, distribution losses in 1995 were close to 20 percent at the national level, and in some places losses were above 30 percent. Electricity distribution operations improved considerably following the sector reform with private participation and the introduction of better management and the influx of new investments.

**Figure 9-5: Evolution of distribution losses 1995-2007**

The most important characteristics for appreciating the increase in distribution efficiency are related to the quality of service and the level of distribution losses. Quality of service is measured by two related parameters, the frequency of power cuts (number of events in a given period), and the duration of the power cuts (the time taken to restore service). OSINERGMIN started to systematically collect statistics on power cuts in 2002, when the level and intensity of power cuts were already at relatively low levels in comparison with those existing the years previous to the reform or the years initially after the reform.

As can be appreciated in Figure 9-6 and Figure 9-7, the frequency and duration of power cuts have been increasing in recent years, in particular in service areas outside of metropolitan Lima. For example, in 2006 the frequency of power cuts in the interior was almost double that of in Lima; their average durations were about three and a half times longer.
One explanation of this difference in quality of service is the relatively low level of investments in maintenance and upgrading of distribution system by the publicly owned companies serving these areas.

**SECTOR STRUCTURE AND OWNERSHIP OF ASSETS**

In this section we will examine the basic electricity sector structure, in particular the market structure, the characteristics of demand and supply, the characteristics of distribution companies, the ownership of the assets in the different segments of the electricity business, and finally the private participation in the
sector.

**Sector structure**

The electricity requirements of the country are provided by two general sources: self generation by some users (mainly “large” mining and industrial consumers) and by “public service” system generation. The sector legislation recognizes two categories of electricity public service users (the demand part of the system market) related to the size of their demand. One category is the so-called “large users,” those with power demands equal or greater than 1,000 kilowatts (one Megawatt); the other category is made up of the “small” retail or regulated users. Large users (also called “free” users) contract directly with generators or distribution companies, through bilateral, freely negotiated contracts. Distribution companies supply electricity to retail or regulated users in their concession areas at a regulated price. The operation of generation (the “dispatch” of supply) is carried out by the Committee for Economic Operation of the System (COES). Figure 9-8 below schematically demonstrates the Peruvian electricity market structure.

**Figure 9-8: Electricity market framework**

Self-generation (and consumption) has been always an important component of overall energy production/consumption in the country, mainly because mining is a major economic activity and traditionally this activity has directly produced a large percentage of its energy requirements (mining in Peru is usually located in remote locations, difficult for the electricity grid to reach). Until 1997, on average, self-generation represented about 21 percent of total electricity generation. Since 1998, with the expansion of the national interconnected system, this percentage has been decreasing, representing on average about 12 percent of total generation in the period 1998-2007. In 2007 this percentage was only 6 percent, indicating the increasing reliance of the large mining industry on the electricity supply from the national system.
It is also worth noting that the major reduction in self-generation has been in hydropower, going from a yearly production of just over 1,300 GWh in the period 1992-1997, to only 705 GWh during 1998-2007. Meanwhile, thermal self-generation has maintained its yearly average production of about 2,100 GWh during the entire period of 1992-2007. The three largest thermal self-generators are Plus Petrol, the operator of the Camisea natural gas field; Repsol, the owner of the largest oil refinery; and Casa Grande, a large sugar cane producer and factory. In 2007, the three largest thermal self-generators produced 575, 78, and 56.4 GWh, respectively, representing 54 percent of the total thermal self-generation. In the case of self-hydroelectric generation, the two largest companies are Cemento Andino, the largest cement producer, and San Ignacio de Morococha, a medium-sized mining company. In 2007, the two companies produced 76 and 54 GWh, respectively; representing 31 percent of the total hydro self-generation.

Although there are no statistics of the cost of this generation, it is clear that the largest self-generators, indicated above, can produce electricity competitively with the system, taking advantage of being providers of the fuel used in thermal generation, using co-generation, or by being owners of hydropower plants. Most of the other self-generators are mining companies located far away from the system network. To illustrate, Figure 9-9 below shows the situation of total generation production in 2007, from system generation for public service and from self-generation/consumption.

**Figure 9-9: Overall energy generation in 2007 (GWh)**

![Energy Generation Chart](chart.png)

Source: COES

As indicated in previous paragraphs, users being supplied by the electricity public service (through the national interconnected grid or isolated systems) are categorized as large (“free”) or small (“retail”), according to the size of their electricity demand. Until 1997, electricity consumption by retail users represented 65 percent of total consumption; the remaining 35 percent corresponded to the consumption by large users. Over the last 10 years, this proportion has changed and now the percentage of consumption of large users represents 46 percent of the total. This more recent percentage is relatively high if compared to other countries in the region where large electricity users’ consumption represents no more than 30 percent of the total. This has a great influence on the electricity market because electricity suppliers can negotiate contracts without the restrictions of a regulated price on a large portion of the demand.

Some statistics would help highlight the relative significance of this market. In 2007, the electricity consumption of the free market, made up of 254 users, was 11,330 Gigawatts-hour (GWh). Of this, mining represented close to 55 percent, followed by the smelting industry with 12.3 percent. Mining also represented the largest number of users, with 58. The largest user is Southern Peru Cooper Corporation, the largest cooper mine in the country, located in the south, in the Ilo/Tacna regions.
Table 9-4 and Figure 9-10 show the situation of the “free” market in 2007.

### Table 9-4: Composition of users in the “free” market in 2007

<table>
<thead>
<tr>
<th>Activity</th>
<th>Number</th>
<th>Activity</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>58</td>
<td>Chemicals</td>
<td>8</td>
</tr>
<tr>
<td>Textiles</td>
<td>32</td>
<td>Glass, Rubber &amp; Plastics</td>
<td>7</td>
</tr>
<tr>
<td>Fishing</td>
<td>19</td>
<td>Sanitary</td>
<td>6</td>
</tr>
<tr>
<td>Agricultural Industry</td>
<td>17</td>
<td>Ceramics</td>
<td>6</td>
</tr>
<tr>
<td>Food</td>
<td>16</td>
<td>Transport</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>Commerce</td>
<td>3</td>
</tr>
<tr>
<td>Metalurgic Industry</td>
<td>12</td>
<td>Banks &amp; Finance</td>
<td>3</td>
</tr>
<tr>
<td>Beverages</td>
<td>12</td>
<td>Hydrocarbons</td>
<td>3</td>
</tr>
<tr>
<td>Paper</td>
<td>11</td>
<td>Cables</td>
<td>2</td>
</tr>
<tr>
<td>Smelting</td>
<td>10</td>
<td>Health</td>
<td>1</td>
</tr>
<tr>
<td>Cement</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>254</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Author’s calculations.*

### Figure 9-10: Consumption by “free” market users in 2007 (GWh)

The retail regulated market had a total of 4,354,660 electricity users with a total consumption of 13,290 Gigawatts-hour in 2007. This market is served by 13 medium to large size distribution companies and about 10 other small companies, each one with less than 10,000 users. The two largest distribution companies are EDELNOR and Luz del Sur, which serve the capital city Lima. Together these two companies have 40 percent of the total regulated electricity users of the country and provide about 63.9 percent of the total electricity of the regulated market. The remaining distribution companies serve all the other electricity users not living in metropolitan Lima. The two largest are Electro Norte Medio (also known as Hidrandina), which serves Trujillo, the largest city in the north, and Electro Centro which serves Huancayo, the largest city in the central Andes.
Table 9-5 below, Figure 9-11, and Figure 9-12 show the main market characteristics of distribution companies serving the regulated market. It should be mentioned, as indicated in a previous paragraph, that the four distribution companies Electro Norte, Electro Noroeste, Electro Norte Medio (Hidrandina), and Electro Centro, together have 1,427,171 electricity clients and annual sales for 2,565 Gigawatts-hour, and are part of the public-owned holding company Distriluz. It is also important to notice that Luz del Sur and EDELNOR have the best markets with average per unit annual electricity consumptions of 5,916 kWh and 3,945 kWh, respectively. Electro Sureste has the “worst” market, with only 1,030 kWh of average per unit annual electricity consumption. The holding company Distriluz has an average per unit annual electricity consumptions of 1,797 kWh.\textsuperscript{120}

Table 9-5: Distribution company characteristics

<table>
<thead>
<tr>
<th>Company</th>
<th>N° of Users</th>
<th>Energy Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDELNOR</td>
<td>985,731</td>
<td>3,889</td>
</tr>
<tr>
<td>Luz del Sur</td>
<td>776,669</td>
<td>4,595</td>
</tr>
<tr>
<td>Electro Norte Medio</td>
<td>468,006</td>
<td>1,007</td>
</tr>
<tr>
<td>Electro Centro</td>
<td>432,532</td>
<td>484</td>
</tr>
<tr>
<td>Electro Noroeste</td>
<td>279,264</td>
<td>655</td>
</tr>
<tr>
<td>Electro Sureste</td>
<td>266,059</td>
<td>274</td>
</tr>
<tr>
<td>Sociedad Electrica Suroeste</td>
<td>261,702</td>
<td>567</td>
</tr>
<tr>
<td>Electro Norte</td>
<td>247,369</td>
<td>419</td>
</tr>
<tr>
<td>Electro Oriente</td>
<td>150,830</td>
<td>297</td>
</tr>
<tr>
<td>Electro Puno</td>
<td>137,423</td>
<td>162</td>
</tr>
<tr>
<td>Electro Sur Medio</td>
<td>130,774</td>
<td>448</td>
</tr>
<tr>
<td>Electro Sur</td>
<td>108,586</td>
<td>228</td>
</tr>
<tr>
<td>Electro Ucayali</td>
<td>47,925</td>
<td>147</td>
</tr>
<tr>
<td>OTHER</td>
<td>61,789</td>
<td>118</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,354,659</strong></td>
<td><strong>13,290</strong></td>
</tr>
</tbody>
</table>

\textit{Source: Author’s calculations based on OSINERGMIN.}

\textsuperscript{120} The indicated figures of per unit consumption should not be confused with household average annual electricity consumption, which is a much lower number. This latter figure is calculated considering only residential users (in quantity and consumption) and therefore industrial and commercial users (with much more per unit consumption) are not considered in the calculation.
Assets ownership

At present, there are about 5,050 MW of capacity generated by installed firms in the country, of which the private sector owns 70 percent (some 3,542 MW). EDEGEL (of the ENDESA Spain group), with 1,553 MW, is the largest privately owned generation company, and ENERSUR (of the Suez Energy group) the second largest, with 826 MW. In the public sector, Electropu, with 907 MW, is the largest generating company and Empresa de Generación de Arequipa, the second largest, with 321 MW.

The private sector owns practically all the high voltage transmission system (with the public sector
owning only some sub-transmission lines to supply remote areas.) Red de Energía del Perú, Consorcio Transmantaro and ISA Perú (all of them part of Interconexión Eléctrica S.A., ISA, of Colombia) own around 5,300 km of 220 and 138 kV transmission lines, which represent close to 85 percent of all high voltage transmission assets.

The distribution segment of the electricity service has at present roughly 4.35 million customers, of which 1.92 million are served by privately owned companies, and the remaining 2.43 million served by various regional public-owned distribution companies. The two largest distribution private companies are Luz del Sur and EDELNOR, which serve the capital city Lima, with 1.76 million costumers. These two companies have a concentrated and profitable market, with good technical and financial indicators. There are a few other privately owned distribution companies, of which the two with largest users’ base are Electro Sur Medio, serving mainly the Department of Ica, with about 131,000 customers, and Empresa de Distribución de Cañete, with about 27,000 customers.

Distriluz, a holding of four regional companies (Electro Centro, Electro Noroeste, Hidrandina and Electro Norte), is the largest of the public-owned companies, serving a diverse market which includes seven departments with medium-sized cities of a moderate load concentration (with 1.43 million customers, or about 7 million people). Distriluz’s market is not highly profitable but has a return sufficient to sustain the business and expand the market modestly. Two other distribution companies which serve the cities of Arequipa (Sociedad Electrica del Sur Oeste, with about 262 thousand customers) and Cusco (Electro Sur Este, with 266 thousand customers) have similar characteristics to Distriluz.

The remaining public-owned distribution companies serve a few medium-sized and relatively small cities and towns with low load concentration, and rural areas with disperse communities and low demand. The three largest of these companies are Electro Oriente, which serves the city of Iquitos, with about 151,000 customers, Electro Puno, which serves the city of Puno, with about 137,000 customers, and Electro Sur, serving the city of Tacna, with about 108 thousand customers. About 81,000 customers are served by eight other distribution companies. Most of these companies are not profitable; some barely cover operating costs, others have operational deficits.

It should also be mentioned that there is one other state-owned company acting in the sector. It is called ADINELSA. This company was created (with a different name) in 1994 and was inactive until 1998 when the government decided to reactivate it, to serve basically as a government electricity assets holding company during the privatization process of the regional distribution companies. This process was truncated and ADINELSA continued administering these assets and subsequently also operated the related small distribution systems associated with these assets, through third party contracts, mainly with local governments (municipalities).

There is also a new ingredient to consider, the decentralization and regionalization of the country. Some regions are disputing central government ownership of the regional distribution companies. In the cases of Arequipa and Cusco, with strong regional sentiments, the government has promised to transfer the ownership of the regional electricity companies to the regional governments. Although the final arrangement has not yet been established, regional ownership and administration of the electricity companies would probably introduce new management and financial problems to the present situation of

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121 Distriluz was privatized in 1998, only to be returned to public hands in August 2001, after the private operator failed to comply with its contractual obligations with the state.
122 ADINELSA owns and operates small systems in rural areas serving some 140,000 electricity users. Financially its operation runs annual deficits in the order of US$4 million.
these companies.

**Private participation**

As indicated in previous sections, the power sector in Peru was reformed and restructured between 1991 and 1993, in line with the thorough economic reforms of the government administration in that time. The intention was that private sector would be the principal economic actor, while the role of the public sector would be in regulation and supervision. Therefore, an ample privatization program was established to transfer controlling ownership of public enterprises to the private sector.

The privatization in the power sector started in 1994 and progressed quite successfully until 1997. Between 1997 and 2000 the privatization process, in all sectors, slowed down considerably due to a combination of domestic and foreign factors like the Russian financial crisis. The “El Niño” climate phenomena, the Peruvian political crisis, and a continuous reduction of public approval were the main domestic factors affecting privatization. As shown in Figure 9-13, surveys carried out by the privatization agency (COPRI) indicated that by end of 1999 only 22 percent of the population approved of the privatization policy of the government.

The government administration of President Alejandro Toledo in 2001 wanted to reengage in privatization, in particular in the power sector where there were still considerable assets in public hands. This intention had an important setback in May 2002, when under strong regional opposition and public outcry, the government cancelled the privatization of Egasa and EGESUR, the two public-owned generating companies serving Arequipa, Moquegua, and Tacna.

![Figure 9-13: Public approval of privatization policy](image)

*Source: Author’s calculation based on COPRI.*

The new administration, which took office in 2006, is pursuing a new approach, emphasizing concessions and public private partnerships instead of privatization. Also, as indicated previously, public companies under FONAFE\(^{123}\) are being allowed to increase investments in new assets and recent legislation allows

\(^{123}\) National Fund for State Enterprise Financing
electricity companies to list shares in the Lima stock market, up to 49 percent of their assets value. This measure is intended to attract private funds and financial discipline in the operations of public-owned companies. Direct sale of public assets seems not to be in the government plans.

Only recently, with the increase in generation thermal capacity in the system, a few new private players have appeared in the electricity sector, different from the companies that participated in the privatization process (although there have been some transfers of ownership of local registered companies to different international parent corporations). Two of these companies are Egechilca and Kallpa Generation.

Table 9-6 below shows the most important private electricity companies in operation in Peru, and their parent international corporations, in each one of the three business segments of generation, transmission, and distribution.

<table>
<thead>
<tr>
<th>Table 9-6: Main private local companies and parent corporations in electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generation</strong></td>
</tr>
<tr>
<td>Local Company</td>
</tr>
<tr>
<td>Cahua</td>
</tr>
<tr>
<td>Egenor</td>
</tr>
<tr>
<td>Edegel</td>
</tr>
<tr>
<td>Empresa Electrica de Piura (EEPSA)</td>
</tr>
<tr>
<td>Egechilca</td>
</tr>
<tr>
<td>Electroandes</td>
</tr>
<tr>
<td>Enersur</td>
</tr>
<tr>
<td>Kallpa Generacion</td>
</tr>
<tr>
<td>Shougang</td>
</tr>
<tr>
<td>Sinersa</td>
</tr>
<tr>
<td>Termoselva</td>
</tr>
<tr>
<td>Source: Author’s elaboration.</td>
</tr>
</tbody>
</table>

On the other hand, Table 9-7 below shows the participation of the private and the public electricity companies in each segment.

<table>
<thead>
<tr>
<th>Table 9-7: Participation of the most important companies (private and public) in each of the three business electricity segments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership</td>
</tr>
<tr>
<td>Company</td>
</tr>
<tr>
<td>Private</td>
</tr>
<tr>
<td>EDEGEL</td>
</tr>
<tr>
<td>ENERSUR</td>
</tr>
<tr>
<td>DUKE-EGENOR</td>
</tr>
</tbody>
</table>
POLICY, INSTITUTIONAL, AND REGULATORY FRAMEWORK

In this section, we will present the major policy, institutional, and regulatory framework of the electricity sector. Also, we will present a brief overview of the natural gas sector policy, considering the strong link and dependency of electricity generation on the natural gas supply from the Camisea gas field, which has relatively large reserves.

Electricity policy, institutional, and regulatory framework

The Ministry of Energy and Mines (MINEM) is the main sector institution, in charge of policy setting, sector general planning, sector main legislation and regulations, and rural electrification. MINEM is also a member of FONAFE’s board of directors, together with the Ministry of Economy and Finance, and other production sectors’ ministries. FONAFE\textsuperscript{124} is the public holding that manages all public-owned enterprises. The main regulatory body in the sector created by law is the Organismo Supervisor de la Inversión en Energía, the Supervisory Commission for Energy Investments, (currently OSINERGMIN), in charge of tariff setting, supervision, and monitoring of the legal and technical regulations for the electricity sector. Antitrust regulation in the sector is the responsibility of INDECOPI\textsuperscript{125}. Figure 9-1 depicts the institutional setup in the sector.

The energy sector in MINEM is the direct responsibility of the Vice Ministry of Energy and three main General Directorates, for electricity (the DGE), for rural electrification (DGER), and for hydrocarbons.

\textsuperscript{124} Fondo Nacional de Financiamiento de la Actividad Empresarial del Estado, the national fund for financing State enterprise activities.

\textsuperscript{125} Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual, the national antitrust and consumer defense institute.
The General Directorate of Electricity (DGE) is responsible for planning, general regulations, norms, codes, concessions, and authorizations, for electricity generation, transmission and distribution. The General Directorate of Rural Electrification (DGER) is responsible for planning, implementation of rural electrification projects, and the promotion of small renewable sources of energy and productive uses of electricity in rural areas.

OSINERGMIN\textsuperscript{126} is the energy sector regulator with two main independent functions: (a) the economic regulation (tariffs setting) of all business segments of electricity and of the transport and distribution of natural gas; and (b) the monitoring, supervision, and regulation of the provision of supply services of electricity and gas to consumers. GART\textsuperscript{127} is the OSINERGMIN unit in charge of tariffs setting. OSINERGMIN has two other important functions, as the final administrative instance for conflict resolution between sector stakeholders, and coordinator of public consultations on energy regulations and tariffs settings.

FONAFE is the public holding corporation, under the Ministry of Economy and Finance (MEF), which manages all public-owned enterprises in which the state has a majority stake. FONAFE was created at the end of 1999 in place of the Office of State Institutions and Organizations (OIOE\textsuperscript{128}), to introduce a corporate vision to the management of the state-owned companies. Five ministries and the office of the Prime Minister constitute FONAFE’s board of directors. The minister of economy and finance is the president of the board. At present, there are 34 public companies under FONAFE administration, 18 of which belong to the electricity sector (the largest group by far)\textsuperscript{129}.

An exceptional case worth mentioning is Electroperu, the largest public-owned generating company (owner of the nation largest power complex of two hydroelectric plants, with a total installed capacity of 907 MW), which is not part of FONAFE. Electroperu belongs to the Consolidated Reserve Fund for Public Pensions (FCRP), which is administered by MEF. Although Electroperu’s annual profits/losses are transferred to the FCRP, and its board of director is designated differently than FONAFE’s, in practice MINEM and MEF are the deciding voices in the designation of Electroperu’s and FONAFE’s boards of directors (two State-Owned Enterprises of the electricity sector).

Market concentration regulation in the electricity sector is the responsibility of INDECOPI, the general Peruvian antitrust, competition, and consumers advocate institution. The Law N°26876,\textsuperscript{130} issued in

\footnotesize{\textsuperscript{126} OSINERG was created in 1997, transferring some MINEM monitoring and supervisory functions in the energy sector. At the time, the Energy Tariff Commission (CTE), created in the Electricity Concessions Law of 1992, was in charge of the economic regulation. In 2000, the two institutions merged in OSINERG. In 2007, some mining monitoring and supervision functions of MINEM were transferred to OSINERG and the name changed to OSINERGMIN.

\textsuperscript{127} Gerencia Adjunta de Regulación Tarifaria

\textsuperscript{128} Spanish acronym for Oficina de Instituciones y Organismos del Estado

\textsuperscript{129} All public-owned electricity companies, including ADINELSA, are administered by FONAFE, which controls all new investment and return/profit policies of these companies. In general, FONAFE’s policy has been to restrict investments and retain profits for transfer to the treasury: not an appropriate practice for long-term sustainability of assets, especially in a business where a large portion of the revenue from tariffs comes from depreciation that is intended to ensure adequate investment in asset maintenance. This policy is changing, allowing management of these companies more independence to operate commercially and lifting restrictions on investments to maintain their assets and to expand services. A recent legislation allows electricity companies under FONAFE to list shares in the Lima stock market, up to 49 percent of their assets value. This measure is intended to attract private funds and financial discipline in the operations of these companies.

\textsuperscript{130} “The Antitrust and Anti-Oligopoly Law of the Electricity Sector”}
November of 1997, established the requirement of an ex ante approval by INDECOPI of any operation of consolidation, merger, transfer of control, buying of stocks, management agreement, etc., which could affect the vertical or horizontal concentration in the sector. INDECOPI intervention is required when horizontal concentration (before or after the operation) represent 15 percent or more of the market, or in the case of vertical concentration, 5 percent or more of the market, in generation and/or transmission and/or distribution of electricity.

**Figure 9-14** below schematically shows the electricity sector institutional framework.

**Figure 9-14: Electricity sector institutional framework**

The Peruvian electricity regulatory system is based on the following main principles: (i) the segmentation of the electricity business into generation, transmission, and distribution/commercialization; (ii) generation is considered a competitive segment of the business, where prices are determined mainly by “free” negotiated transactions and the results of supply auctions; (iii) transmission and distribution/commercialization are regulated businesses; and (iv) prices to the regulated segment of the demand are determined by cost-causation and/or benefit-causation.

An important final issue in the Peruvian power sector is the general role of the public sector, in particular its dual role as “promoter of private investments” and owner and manager of electricity companies. The legal and regulatory framework of the sector is clear in defining other basic roles of the government as policy and rule making, concessioning, general (referential) planning, economic regulation, and the supervision and monitoring of sector activities. Although the legislation implicitly gives the private sector the initiative in providing the required investments of necessary system expansion, there are still an important number of public-owned companies operating in the sector, servicing a relatively large market segment in generation and distribution.
This was not a particular sector design characteristic of the reform but the result of an unfinished privatization agenda which started in 1992, with the goal of transferring all public-owned sector assets to the private sector. From 1993 to 1997, with the decisive backing of the government, a relatively successful privatization program in the sector was carried out. Thereafter, the pace of the program slowed down and the government started to react to criticisms and opinion polls showing mixed results on public opinion regarding privatization. As indicated previously, the government administration of President Toledo in 2001 wanted to reengage in privatization but its intention had an important setback in May 2002, when under strong regional opposition and public outcry, the government cancelled the privatization of two public-owned generating companies.

As a consequence, the government shifted its attention to concessions and public-private associations through ProInversión, the specialized governmental agency for the promotion of private investments. This is a high level unit whose board consists of seven ministers and is presided over by the the prime minister. ProInversión’s main role is the promotion of private investments, through the transfer of existing public assets, mainly in the hands of public-owned companies or agencies (a privatization process\(^\text{131}\)), and the concession of infrastructure facilities in classical Build Own Operate Transfer\(^\text{132}\) schemes and variants. ProInversión’s main activities have been centered in the concession of transport facilities like roads, ports and airports; activities regulated by contracts. ProInversión can sign legal contacts in the name of the government, giving these contracts a high level status in Peruvian legislation.

**Power generation and natural gas policies**

The Peruvian electricity sector is strongly linked and dependant on the natural gas supply from the Camisea gas field, with relatively large reserves. Although the legislation of the Peruvian hydrocarbon sector considers the sector a part of a competitive market, the government has a particular interest in establishing related sector policies, in particular regarding internal consumption and conditions for exporting. As explained in this section, the situation of the natural gas (NG) supply from Camisea, in particular the limitation of transport, has affected and could continue to affect electricity generation.

The Camisea project started operation in August of 2004. Transport of natural gas from Camisea is provided by a single pipeline from the field to the city gate in Lurin, 60 km south of Lima, the charge of “Transportadora de Gas del Peru” (TGP). From Lurin to Lima-Callao (the terminal station) the transport is provided by Calidda, the Lima gas distribution company. From the point of view of power generation, there is also a pipeline section from the terminal station in Callao to Ventanilla (northern part of Lima), where a major thermal plant of the same name, is located. The other three power plants that use the Camisea natural gas as fuel are Santa Rosa, located in downtown Lima, and Chilca and Kallpa located in Chilca, 70 km south of Lima, near the city gate.

The pipeline has different sections along its route. The initial section of about 211 km, from the field to the end of the rain forest area of the route, has a diameter of 32 inches with a maximum capacity of 1,200 MMCFD\(^\text{133}\). The second section of 297 km, in the Andes area, has a diameter of 24 inches and a maximum capacity of 450 MMCFD. The third section of 226 km up to the city gate, in the costal area,

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\(^{131}\) In December 2002, during the Toledo administration, the government pushed EGESUR privatization (the public-owned generating company serving Arequipa), against strong opposition by the regional authorities and the local population. The government lost this confrontation, resulting in a setback and “freezing” of the privatization program.

\(^{132}\) Build Own Operate Transfer

\(^{133}\) Millions of Cubic Feet per Day
has a diameter of 18 inches and a maximum capacity of 400 MMCFD. The pipeline section of 60 km from the city gate to the terminal station in Callao has a diameter of 20 inches and a maximum capacity of 200 MMCFD. And finally, the pipeline of 7 km that supplies gas to the Ventanilla power plant has a diameter of 14 inches and a maximum capacity of 150 MMCFD.

It should be mentioned that the actual compression installations of the transport pipeline are not sufficient to allow the use of the second and third sections of the pipeline at their maximum capacities. The present estimated capacities of these sections are 250 and 200 MMCFD, respectively. Although TGP is already in the process of expanding the compression installations, it is expected that a first stage of the required facilities, for a capacity of 380 MMCFD, be operational by mid- to end 2009, and the second stage, to reach the maximum capacity of 450 MMCFD, be ready by the beginning of 2010.

Camisea natural gas use for power generation started modestly at a low level, to provide the fuel requirements of basically a single generating plant (Ventanilla), totaling a consumption of 360 MMCF till the end of 2004. The power generation consumption grew very fast, reaching almost 46 thousand MMCF in 2007, representing a daily average of 125.6 MMCFD. Estimates of the demand for natural gas from Camisea for power generation in the next five years indicate an 80 percent increase to about 235 MMCFD by 2012, which corresponds to between 700 to 800 MW of additional gas-fueled thermal power generation to the level in 2007. The present capacities of the final sections of the pipeline are starting to create bottlenecks to the supply of gas. The expected demand in 2008 for power generation is 164 MMCFD and for other uses about 76 MMCFD, totaling 240 MMCFD, greater than the present capacity of the coastal section and practically at the limit of the capacity of the Andes section.

Once the full capacity of the Camisea pipeline is available by 2010, the ministry of energy and mines (MINEM) has estimated that between 2,200 and a maximum of 2,800 MW of new natural gas-fired thermal generation could be installed using the reserved NG from Camisea for internal use (discounting uses other than power generation). MEM has also indicated that the electricity sector should not rush to implement this amount of potential capacity but should use other alternative and renewable energy sources like hydro or wind power. How this policy would unfold, considering the cheap price of natural gas from Camisea, is not very clear.

The Camisea natural gas price for internal use in power generation is one of the cheapest in the region, creating a certain distortion in the power market, in particular for the development of alternative generation like hydroelectricity. This price is also a disincentive to the efficient use of natural gas in thermal power generation, making uneconomical to install combine cycle units.

**Table 9-8** shows the 2008 Camisea natural gas price for power generation for each of the four main thermal power plants, two of them located in the metropolitan Lima area (with the price therefore including the gas distribution costs), and the other two located close to the city gate, south of Lima. Ventanilla, as the first plant to sign a gas supply contract, has a special discount on the field price.

<table>
<thead>
<tr>
<th>Item</th>
<th>Ventanilla</th>
<th>Santa Rosa</th>
<th>Chilca</th>
<th>Kallpa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field</td>
<td>1.3065</td>
<td>1.3753</td>
<td>1.3753</td>
<td>1.3961</td>
</tr>
<tr>
<td>Transport</td>
<td>0.7398</td>
<td>0.7398</td>
<td>0.7392</td>
<td>0.7402</td>
</tr>
<tr>
<td>Distribution</td>
<td>0.1218</td>
<td>0.1218</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>2.1681</td>
<td>2.2369</td>
<td>2.1145</td>
<td>2.1363</td>
</tr>
</tbody>
</table>

*Source: Author’s elaboration.*
Although the cheap price of gas is translated to a low energy production cost for the thermal plants that use the Camisea natural gas as fuel, electricity users have an additional charge in their bills to pay for what is called the “Garantia de Red Principal” (GRP\textsuperscript{134}), which compensates part of the investment cost of the gas pipeline.\textsuperscript{135}

As shown in Table 9-8, the price of natural gas at point of generation in Lima and locations close to the city gate is around US$2.2 per million BTU. For comparison, Table 9-9 below shows natural gas prices in other countries and the resulting electricity energy cost produced by combine-cycle units.

<table>
<thead>
<tr>
<th>Country</th>
<th>Gas Price, (US$/MMBTU)\textsuperscript{136}</th>
<th>Corresponding CCGT\textsuperscript{137} Generation Variable Cost, (US cents/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam</td>
<td>3.20</td>
<td>2.24</td>
</tr>
<tr>
<td>Georgia (imports from GAZPROM)</td>
<td>3.50</td>
<td>2.45</td>
</tr>
<tr>
<td>Azerbaijan (imports from Russia)</td>
<td>6.77</td>
<td>4.74</td>
</tr>
<tr>
<td>USA, October 2007 Henry Hub Spot Price</td>
<td>7.02</td>
<td>4.91</td>
</tr>
</tbody>
</table>

Source: Author’s elaboration.

Recent preliminary Bank studies\textsuperscript{138} indicated that the economic netback price (at the field) for alternative uses of natural gas from Camisea other than power generation (like petrochemical, LNG, or industrial use) were in the range of US$5/MMBTU for LNG\textsuperscript{139} (for supply to Mexico) to about US$9/MMBTU for industries that replaced liquid fuels. Also, the studies showed that the present thermal generation production cost, using Camisea NG, of about 3.5 cents of US$ per kWh, makes most potential hydropower projects uncompetitive.

The use of this relatively abundant indigenous source of energy is a policy priority for the country, considering that negotiations during auctioning of the exploitation of the main field in Camisea, and later contractual renegotiations, established a discounted internal price for all type of consumption and in particular for power generation.

The official MEM energy policy regarding the Camisea natural gas price is to maintain this promotional internal price at least for the period stipulated in the renegotiated contract with the producers (which allows for no more than a 5 percent increase in the price of natural gas annually, and not larger than the

\textsuperscript{134}“Main Network Guarantee” in English. Studies for the Camisea gas pipeline indicated unattractively high transport tariffs, due to the expected low demand during initial years of gas production. Investors in the pipeline required the government to guarantee a minimum capacity usage/payment during the first years of operation. MEM and the regulator designed the GRP as a payment guarantee.

\textsuperscript{135}For example, in 2007, the gas transport tariff to pay for the GRP was US$1.381 per Megawatt-month, which is equivalent to approximately 0.245 cents of US$ per kilowatt-hour. The GRP is reaching its termination; therefore its tariff was reduced considerably in 2008 (about one-fifth of the 2007 GRP tariff).

\textsuperscript{136}One million British thermal unit (1 BTU = 1 kJ)

\textsuperscript{137}Combined cycle power plant

\textsuperscript{138}Peru, Institutional and Financial Framework for Development of Small Hydropower, ESMAP draft report, June 2008; Peru, Framework for Hydropower Development, Section of Valuation of Natural Gas Alternative Uses; ongoing study.

\textsuperscript{139}In the case of electricity generation, LNG would be the economic alternative if Camisea NG were not available.
percentage increase of liquid fuels) and after this initial period of five years, the annual increases should be lower than the percentage increase of liquid fuels. In any case, the initial price gap will persist in the future. This price policy applies to the initial fields of Camisea (known as lots 48 and 55). Any other exploitations or NG fields in the same area of Camisea or in other places are not subject to this price policy.

Finally, it should be mentioned also that MEM has indicated that one other important policy regarding the use of the natural gas from Camisea is minimizing its utilization as fuel for power generation, for which the government has passed new legislation to promote (providing cross-subsidies) hydropower generation and the uses of other renewable sources of energy for electricity generation.

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**PLANNING AND INVESTMENT PROCESSES**

We will see in this section that the planning function of the public sector in generation, transmission, and distribution in urban areas was limited as a consequence of the reform and privatization process of the electricity sector. The public sector planning and investment has been limited in general to rural electrification.

**Planning and investments in generation and transmission**

The sector reform of the 1990s separated and defined the role of the public sector, basically constraining public interventions to regulation and monitoring/supervision of the energy sector. Although planning was still MEM function, this was reoriented as a “referential” policy, stripping out any previous characterization as “mandatory.” The result was the production of a periodic “Referential Plan” document, using the same pre-reform models/methodologies, or slight variations of them, in which the dynamics of private participation/decision in new investments was not considered. Clearly this referential plan was of limited value to sector stakeholders, considering that most investment decisions were in the hands of the private sector. The new legal framework for electricity, established in 2006, reintroduced mandatory transmission planning as a “public” function of COES, the independent network operator, but the regulatory changes in generation expanded the role of the “private” market through the introduction of an electricity supply auction system.

Therefore, now the legal framework of the sector has a combination of public-mandated transmission planning and a (private) market approach regarding generation expansion. How this mixture would play out in practice is unknown, considering that by its own nature electric power expansion has to deal simultaneously with generation and transmission. In the particular case of hydropower this interrelation is even more important, given that in many cases the cost of transmission for hydropower could be the economic or financial dealmaker or deal-breaker of a project.

**Rural electrification planning**

The existing electricity distribution companies hold concession areas concentrated around urban centers. They are obliged to meet service requests only within 100 meters of the existing network. Therefore, there is no obligation for distribution companies to expand electricity coverage outside of these areas. MEM, through the Executive Office for Projects (DEP) of MINEM, was created in 1993 to implement rural electrification projects, and is in charge of planning, design, and construction of electricity service expansion in these areas. The projects that were constructed were transferred, at zero cost, either to the existing distribution companies, or to the state-owned distribution assets holding company, ADINELSA.
The activities of DEP in the last decade contributed to increasing national electricity coverage levels from 70 percent in 1998 up to 79.5 percent in 2007. Over the same period, rural electrification coverage increased from 10 percent to about 32 percent. As shown in Figure 9-15, the distribution of electrification coverage in the country is very uneven. Fifteen departments/regions out of the total of 24 have an electrification index lower than the national average, and in three of them the index is lower than 50 percent (more than half the total population without electricity service). Despite these advancements, in 2008, about 5,700,000 people, mainly in the predominantly poor rural areas of Peru, do not have access to electricity.

Figure 9-15: Regional electrification coverage

It is also important to notice that there is a close correlation between the rural population in a region and low electricity coverage. This fact can be appreciated looking at Figure 9-16, depicting the relation of electrification coverage versus the percentage of rural population in relation to total population, in each region. Although there are some particular cases (like Huancavelica, or some regions in the jungle like Loreto and San Martin), the correlation is quite good. This confirms the fact that it is much more difficult, and costly, to reach disperse, remote rural areas to provide electricity service.

Figure 9-16: Correlation of electrification coverage and rural population

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140 As indicated in footnote 4 of the Overview section, this figure of electrification coverage is much larger than the one produce by INEI's 2007 census.
During the previous government administration, interest in rural electrification started to gain momentum and culminated with the passing of the General Law N°28749 of Rural Electrification, in June 2006, just a couple of months before the new administration took office. The most important provision of this law is the formal establishment of the required permanent funding of rural electrification projects, independent of the annual assignment through the national budget. Another important signal on the part of the present government of the increased importance of rural electrification was the establishment in 2007 of the General Directorate of Rural Electrification as a permanent unit in the MINEM official structure. This unit will manage all aspects of rural electrification in MINEM, incorporating two mechanisms to develop rural electrification projects, the classical DEP approach for “social-based” projects and the new approach supported by the World Bank-funded rural electrification project, which promotes the implementation and operation of “financially sustainable” rural electrification projects by the distribution companies.

The more active decentralization policy of the new administration is also noted in rural electrification, with the participation of the regional and local governments in rural electrification planning, in the formulation and development of projects, including project contracting and implementation, and in provision of some funds for project financing. The 2006-2007 budgets included special assignments for
the “investment shock” program of the government, in which the regional and local governments were important players. In rural electrification, the “investment shock” provided funds for some 240 projects in the amount of about US$65 million141. The 2008 investment program for rural electrification estimates a budget of US$200 million (including assignments for the remaining of the “investment shock” program). About two-thirds of this program (in the number of projects, which represent only one-fifth of the total funds) are being executed by the regional and local governments and the remaining by MEM itself. The funds for the projects, and technical assistance and implementation guidance, are provided by MEM.

The regions that received more funds in the 2006-2007 budgets for rural electrification projects (including the “investment shock” program and MEM itself) were Ayacucho, Cajamarca, and Puno, with about US$50 million, representing 67.5 percent of the total (Ayacucho alone received 42 percent of the total). The 2008 budget execution (up to July 2008) is more evenly distributed, but still these three regions have received about 33 percent of the total funds.

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**SECTOR INVESTMENT AND FINANCING**

In this section we will examine the contribution of public and private investments to sector expansion requirements since sector reform in 1992. The public sector investments were concentrated mainly in the distribution area, in particular in the rural electrification program of the government. The expansion in distribution in the capital city Lima and in generation and transmission is mostly done by the private sector, which owns major assets in these segments.

**Sector investments**

It can be appreciated in Figure 9-17 and Figure 9.40 below, showing the overall and private sector electricity investments in the period 1995-2007, that in the initial years after the reform of the sector in 1991-1992, investments in generation, transmission, and distribution increased year after year reaching a peak of about US$760 million in 1999. Then investments, overall and by the private sector in particular, started to decrease until a bottom low of US$236 million in 2003. For example, the average annual generation investments during the period 1995-2000 was US$280 million (of which 62 percent came from the private sector), two and a half times more than during the period 2001-2004 (only US$116 million, of which 38 percent came from the private sector). Although annual investment in generation recovered in from 2005 to 2007, damage had already been caused by the delay in the implementation of required new power plants.

Also, it is worth noting that investment in the transmission system has been always a relatively low percentage of total investments in the sector, representing only just over 10 percent (for example in 2007, transmission investment was US$78.3 million, 11.2 percent of total investment of US$698.7 million). This level of investment in transmission, for a large country geographically and with a very difficult topography, is insufficient to guarantee a secure electricity service. Only the central western part of the country (where the main generation and load centers – and the capital city Lima – are located) has a relative adequate transmission system. The north and south regions of the country are interconnected with weak transmission links with insufficient capacity and reserve. So, it is not a surprise that transmission congestion is becoming a serious problem for a secure operation of the power system.

141 In 2007, another US$28 million was invested in rural electrification projects managed directly by MEM.
In the case of rural electrification, although levels of investments show signs of recovery in the last two years, including a World Bank loan for rural electrification, the amounts are still much lower than the record high of US$136 million in 1996. The GoP maintains a commitment to reduce the electrification gap, aiming to increase rural coverage from 30 percent to 80 percent by 2015.\textsuperscript{142} This is estimated to require about US$93 million annually, for the 10-year period. The permanent funding provided by the rural electrification law, estimated at US$40 million per year, is not enough to cover the yearly requirements to reach the indicated target, therefore specific provisions in the national budget are still necessary. For example, the 2007 national budget provided US$63 million for rural electrification, up 80 percent from 2005.

Considering the high growth rate of electricity demand in recent years (up 10.8 percent from 2006 to 2007), relatively large investments in electricity infrastructure are needed to follow suit, and to avoid supply restrictions. Even if the growth rate slows down to a more moderate level of 7 percent (in line with the expected reduction of the rate of economic growth of the country), the average new generation capacity requirement, in the next five years, to adequately supply this demand, is 400 MW per year\textsuperscript{143}, with a total of 2,000 MW. This means that no less than about US$2.25 billion in new investment in generation, transmission, and distribution are required in the next five years. This amount is only for investment in new assets, not including required investments in rural electrification, and funds for repairs and upgrading of existing assets. For the sake of comparison, the annual average overall investment in the sector in the five-year period from 2003 to 2007 was US$426 million.

\textsuperscript{142} From MEM Rural Electrification Plan of 2006-2015
\textsuperscript{143} About 365 MW for the increase in demand and some 35 MW to keep the present low 10 percent of reserve margin. To increase (and keep) the reserve to 20 percent, 35 to 40 MW additional capacity would be needed each year.
Figure 9-17: Overall investments in the electricity sector 1995-2007 (in millions of US$)

Source: Author’s calculations.
Financing

Financing for public sector investments comes from: (i) the national budget, including external credits from IFIs, mainly for rural electrification; (ii) cross-subsidies assigned for investments, also for rural electrification; and (iii) internal generation of funds for distribution expansion by the public-owned distribution companies (as indicated previously, FONAFE restricts its companies from acquiring long-term debt financing for investments).

In the case of the private sector, all traditional sources of financing are available, including bond issues in the local capital market, at very competitive costs. It is expected that due to the financial crisis, the loan conditions will deteriorate in the future and issuing of corporate bonds for project financing in the electricity sector would be more expensive.

MAIN CHALLENGES AND RECOMMENDATIONS

The Peruvian electricity sector is among the few in LAC that has not confronted a real crisis since its reform in 1992. However, in 2004 some supply difficulties began to appear, due mainly to unfavorable hydrological conditions and the failure of distribution companies to secure supply contracts with generators, combined with the initial impacts of rising oil prices.

Aside from the hydrological problems, the supply difficulties in 2004 were only the symptoms of an increasing uneasiness in the private sector, which complained of the “low unattractive” regulated electricity prices determined administratively by the regulator, which it argued prevented required investments in new generation and transmission. The difficulties in 2004 continued in 2005 and in practice forced the significant sector regulatory change of 2006 (the Law 28832). The electricity law of 2006 introduced a major conceptual shift concerning the formation of electricity prices in generation and...
transmission; from economic cost-based regulated tariffs of the original 1992 electricity law to basically a price pass-through system of the results of supply competitive auctions for generation, and construction and operational costs biddings for transmission.

The situation now is that the regulatory system is in a transition period until all required detail regulations of Law 28832 are developed, approved, and implemented. For example, long-term supply auctions regulations have not been completed and only short-term auctions have been established, under a transitory disposition of Law 28832, applicable until the middle of 2009. Also, just recently (in July 2008) distribution companies and large users were incorporated in COES and its new board of directors appointed; COES, under Law 28832, has a new responsibility in transmission planning, which will define the required new network facilities, to be contracted through a competitive bidding process.

The Peruvian electricity sector, as indicated above, is facing some important short-term problems, which have been developing over recent years, exacerbated by the unexpected large increases in electricity and natural gas demands of the past two years, and a renewed risk aversion of the private sector. As a consequence, investments in new generation and transmission facilities have been lagging, producing a reduction in the generation reserve margin of the system and transmission operation congestion in parts of the high voltage network. These problems have been compounded by a simultaneous congestion of the Camisea gas pipeline during peak hours of electricity consumption, originated by the existing limited operational capacity of the pipeline.

In addition to the indicated short-term issues, there are also some medium- to longer-term problems in the Peruvian electricity sector that need to be addressed. In the following section, we lay out the 10 most important strategic issues and the corresponding recommendations, starting with the ones for the short term (the first three).

### Strategic priority No. 1: Avoid short-term generation shortages

In the short term, it is undeniable that any forced outage of any medium to large size generating plant, a delay of the rainy season or a drier year than usual, most probably will produce “brownouts” due to the very limited existing generation reserve margin. This situation will persist until new generation comes on line expected by the end of 2009 and the middle of 2010).

**Recommendation:** Implement the most important measures proposed in DL 1041, to improve generation availability, and other emergency complementary actions. These measures should be temporary and clearly focused to avoid any long-term negative impact in the regulatory framework, generation efficiency, or electricity prices.

### Strategic priority No. 2: Reduce bottlenecks in electricity transmission

The bottlenecks in transmission, in particular the limited capacity to evacuate the thermal generation production at Chilca substation, where a large percentage of the new and future gas-fired thermal

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144 The natural gas from Camisea is the main fuel for the increasing thermal generation in the system.

145 “Brownouts” are temporary selective partial cuts of electricity service to portions of the demand to balance available generation supply. The term “blackout” is used in the case of a total or quasi-total lost of electricity service due to a sudden large imbalance of demand and supply.
generation is located, is being addressed by the government, which has approved an urgent temporary transmission expansion plan. Most of the required lines in Chilca have already been contracted but construction could take one to two years. Other transmission bottlenecks should also be addressed with similar actions.

**Recommendation:** Continue implementing temporary transmission programs designed by MEM, through the intervention of ProInversión, until the transmission system planning mechanism established in the new sector law is fully operational. ProInversión interventions should be fully coordinated with the regulator OSINERGMIN, to avoid any contractual conditions that could result in special conditions not contemplated in the established transmission regulations.

### Strategic priority No. 3: Reduce bottlenecks in natural gas supply and transport

The other major short-term problem in the electricity sector is the present limited capacity of the Camisea pipeline, which transports the natural gas fuel for a large portion of the electricity thermal generation. This temporary limited capacity is the result, on the one hand, of the way in which the contractual capacity obligation of the gas transporter was set up, and on the other hand, of the “unexpected” rapid growth of gas demand, in almost all sectors, and in particular for electricity generation (residential gas consumption is the exception with a very small growth).

The operational contractual capacity of the gas pipeline is, as commonly practiced, tied to firm capacity requirements. New thermal generators were not ready to sign up for this type of obligation, which makes sense in the case of combine cycle plants with relatively high plant factors, but usually are not economically justified for open-cycle plants\(^{146}\). Although at peak hours the pipeline could be at the limit of its operational capacity, usually there is enough capacity during the rest of the hours. This mismatch between operational capacity requirements and contracted firm capacity, which triggers the capacity obligations of the gas transporter, is the root of the existing temporary problem. The last open season for gas transport indicated that now there is more than enough firm demand of the pipeline to secure the necessary increase of its operational capacity. As mentioned in a previous section, the first stage of the required facilities, for an operational capacity of 380 MMCFD, was ready by the end of 2009, and the second stage, to reach the maximum capacity of 450 MMCFD, will be ready by middle of 2010.

**Recommendation:** Ensure that required production and transport capacity of the Camisea gas pipeline match as much as possible with demand, considering particular requirements of firm and not firm supply and transport. It should be pointed out that short-term demand requirements of natural gas from Camisea are higher than the available supply; therefore a short-term measure should be accompanied with longer term actions in production and transport. Also, demand forecasts after the economic crisis most probably will show a reduction trend.

### Strategic priority No. 4: Expand rural access

Although electricity service in urban areas is considered satisfactory and the commercial part of the industry is in general operating quite well, the situation is quite different in rest of the country in particular in the rural and remote areas. In 2008, about 5,700,000 people, mainly in the predominantly

\(^{146}\) As it was mentioned before, the present low price of gas makes very difficult to economically justify the installation of combine-cycle plants.
poor rural areas of Peru, lacked access to electricity. Although the official figure for the overall electrification coverage in the country is 79.5 percent, it hides the disparities of the different regions, where one can find a region with less than 40 percent electrification (Cajamarca) and others with almost 100 percent (like Lima). At 32 percent coverage for the rural areas, Peru’s rural electrification rate is one of the lowest in Latin America.

**Recommendation:** Expand as much as possible all electrification programs to increase access, in particular to rural areas. Due to the topographical conditions of the country, the electrification programs should incorporate efficient renewable energy sources for remote areas. These programs should be accompanied with promotional actions to increase the average consumption of electricity in the rural areas, in particular for productive uses.

**Strategic priority No. 5: Improve the electricity regulatory framework**

As indicated in the section on Policy, Institutional, and Regulatory Framework, the two main sector regulatory institutions are the Ministry of Energy and Mines and OSINERGMIN. The division of functions between these two institutions was clearly established in the Electricity Law of 1992, its regulations and complementary legislation. Although there has been a sound “competition” of these institutions in defining regulatory details, OSINERGMIN has never openly challenged MINEM regulatory decisions, and MINEM has done the same with tariff decisions and monitoring/supervisory activities of OSINERGMIN.

The major changes introduced in Law 28832 required extensive detail regulations, which have taken almost two years until now, and still have not been fully completed. One example of a missing important piece of regulation is for long-term supply auctions, which would allow the construction of new power plants, in particular hydroelectric generation. Pressured by the short-term problems of the sector, MINEM has been very actively trying to prevent a potential supply crisis, proposing additional “promotional” legislation, like: operational dispatch changes to induce the conversion of open cycle gas units to combine cycle; using price premiums for renewable sources of electricity generation; price discounts to new hydropower plants when competing with thermal units in supply auctions; authorizing public-owned generating companies to hire or buy emergency generating units, etc.

Most of these recent regulations have been enacted with limited consultation with stakeholders and with the regulator, and in some cases are not fully compatible with the general framework of the electricity concession law of 1992 and the reform law 28832 of 2006. For example, discounting the price of hydropower generation competing with thermal (and any other traditional generation) goes against the fairness principle in the competitive supply auctions established in the law 28832. Promotion of some renewable electricity generation, like wind power, in a country with large hydro potential and important natural gas reserves is perhaps not the best strategy. Also, the economic costs of most of the proposed promotional measures are transferred to consumers through increase in tariffs. In summary, the economic rationale behind all this new legislation is unclear.

The government has reacted quickly to some of the problems in the sector by way of specific changes to the existing legal framework or approving ad hoc measures. For example, the legislative decree (DL) N°1041 has introduced a series of measures with wide impacts on system operations and electricity prices/tariffs. Also, the Emergency Decree N°037-2008 of August 21st, 2008, allows public-owned sector companies to acquire necessary generation capacity to avoid power cuts, following a procedure outside of the established regulatory framework. Additionally, to move more quickly in promoting hydroelectricity, MINEM is contemplating using the ad hoc bidding mechanisms of ProInversión, instead of the auctions
system of the electricity law. Finally, the economic and financial costs impacts of all these measures will be transferred, directly or indirectly, to electricity consumers.

Some sector observers and specialists, although recognizing the need for actions to deal with the mounting problems in the sector, argue that most of the recent measures introduced by the government will have little or no impact in changing the short-term perspective; could produce inefficient economical solutions; and could introduce undesirable long-term side effects in the general legal and regulatory framework of the sector.

**Recommendation:** Complete the regulatory framework established in reform Law 28832, issuing all detail regulations and norms and avoid ad hoc interventions in the regulatory system. If necessary, complement Law 28832 with necessary new or adjusted norms.

### Strategic priority No. 6: Correct deficiencies in the electricity market

The main signal for the supply and demand response in a market is the price of the good or service being traded. Even in imperfect markets like electricity, its price constitutes perhaps the single most important reference in determining new investments. Before the regulatory change in 2006, generators complained, as indicated in previous sections, that the main source of the price distortion in the electricity market was the inherent regulatory “discretion” in administratively establishing the generation tariff to the regulated market, resulting in a relatively low generation tariff, unattractive for new investments.

Although, the regulations, before the changes introduced in 2006, established that the generation tariff could only fluctuate inside a band of plus or minus 10 percent of the free market prices, most of the free-negotiated supply contracts were linked, directly or indirectly, to the regulated generation tariff. So, in practice, instead of the generation tariff to follow the free-negotiated electricity price, suppliers preferred to use the administratively determined generation tariff as a reference price. A kind of inconsistency of suppliers should be noted, who on one hand complained about the discretion of the regulator in establishing the generation tariff, and on the other hand, using this same signal as a reference in their freely negotiated contracts with large users.

It is also important to point out that contrary to the economic logic, the mining sector comprising the larger electricity users in the country in some cases negotiated electricity prices from their suppliers at levels higher than other “smaller” large users. Although self-generation is a viable alternative to large users when electricity supply from the system is unreliable or too expensive, in most cases this is really not an economic option in normal conditions; therefore electricity suppliers have some market power in their negotiations with “free” users.

What can be distilled from preceding paragraphs is that the market of large users, which represents about 50 percent of total electricity demand, has not provided the necessary linkage, and serves as the guiding signal for the determination of the generation tariff, for the regulated and retail electricity users. Somehow this “failure” of the model (or failure of the market participants to respond as expected by the model) has contributed to the drastic change in the market design, brought about by the regulatory change of 2006. The regulatory change was triggered mostly by the persistent complaint of generators about the low generation tariff determined by the regulator, which made new investments unattractive. It should be pointed out that no detail study or analysis of the electricity “free” market has been carried out, considering its quantitative size and the importance of being a market “not contaminated” by the regulator tariff decisions.
Recommendation: MEM and OSINERGMIN should closely follow the behavior of the large users’ electricity market, which represents about 50 percent of the total demand of the country, “reintroducing” the price signal of this market in the formation of the overall electricity price. As in other countries, it is advisable to incorporate an Independent Market Monitoring group to follow electricity market behavior and make recommendations.

Strategic priority No. 7: Eliminate, gradually, the natural gas price distortions

As was mentioned in the section on sector policy, the other major price distortion in the sector is the natural gas price for thermal power generation, which represents 32 percent of total generation, and increasing. It should be pointed out that this “distortion” is the result of the application of a special internal price, different (lower) than the potential “economic” price of natural gas if compared to its substitutes or the use of natural gas for purposes other than electricity generation. Even hydro projects with unit investment cost of US$1,500 per kW installed and a plant factor of 70 percent, would require a buying price of about 5.7 cents of US$ per kWh to be financially viable.

These numbers show the existing large gap between the actual price of NG from Camisea and potential economic prices for alternative uses of this gas, and also the alternative of hydropower for electricity generation, the other large indigenous energy resource of the country. The use of this relatively abundant indigenous source of energy is a policy priority of the country, considering that negotiations during auctioning of the exploitation of the mail field in Camisea, and later contractual renegotiations, established a discounted internal price for all type of consumption and in particular for power generation.

The official MEM energy policy regarding Camisea natural gas price is to maintain this promotional internal price at least for the period stipulated in the renegotiated contract with the producers (which allows for no more than a 5 percent increase in the price of natural gas annually, and not larger than the percentage increase of liquid fuels) and after this initial period of five years, the annual increases should be lower than the percentage increase of liquid fuels. In any case, the initial price gap will persist in the future. This price policy applies to the initial fields of Camisea (known as lots 48 and 55). Any other exploitations or NG fields in the same area of Camisea or in other places are not subject to this price policy.

Finally, it should also be mentioned that MEM has indicated that one other important policy regarding the use of the natural gas from Camisea is minimizing its utilization as fuel for power generation, for which the government has passed new legislation to promote - through cross-subsidies - hydropower generation and the use of other renewable sources of energy for electricity generation.

Recommendation: Limit in time and scope the “promotional” price of the natural gas from Camisea, in particular to the electricity sector, to avoid efficiency distortions in thermal generation and additional barriers to competitive alternative sources of energy like hydropower generation.

Strategic priority No. 8: Improve overall energy and system planning

Most of the long-term planning methods used for producing the electricity referential plans were developed for a regulated electrical power model, based on a centralized system optimization perspective. In the case of a private market, decision making is decentralized. In theory, according to welfare economics, a perfect market gives the same result as a centralized system optimization. A centralized system optimization perspective can therefore still be used as the starting point for making a benchmark
in long-term analysis of restructured power systems. However, alternative planning methods are needed, which focus more on how power markets can deviate from the long-run equilibrium, and also on how the individual participants can optimize their positions with respect to the rest of players.

Electrical power supply is a complex system, not only from an engineering perspective, but also from an economic and regulatory point of view. There is a fundamental trade-off between the use of competition and regulation in order to provide cost efficiency and, at the same time, maintaining of the security of electricity supply. Security of supply (more precisely, adequacy of supply) represents the ability of the system to meet the aggregate power and energy requirements of all consumers at all times. Power system adequacy/security represents the system’s ability to meet demand, on a longer time scale basis, considering the inherent fluctuation and uncertainty in demand and supply, the non-storability of power and the long lead time for capacity expansion.

**Recommendation:** Implement a more consistent energy and electricity planning framework in the sector with an effective monitoring process. Explore the option to institutionalize the planning in a specialized independent planning unit.

<table>
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<tr>
<th>Strategic priority No. 9: Ensure security of supply</th>
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<tr>
<td>Most of the sector reforms carried out in the region, including the one in Peru, did not consider explicitly the topic of adequacy/security of power supply. It was implied in the reform models that the “competitive” market price signals would provide the necessary incentive/disincentive to expand or not expand the system to a near optimal economic security level. In the case of Chile, its sector’s legal framework established penalties to private generators in case of failure to adequately provide the necessary generation to serve the demand, implicitly making the private generators responsible for security of supply. The electricity crisis of 1998 in Chile, in which private generators refused to accept responsibility for the shortage in generation, demonstrated the weakness and inapplicability of this type of regulation.</td>
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<td>If the provision of electricity planning, security of supply, and the proper functioning of an imperfect power market in a country will be always the final responsibility of the sector national authorities, the sector legal framework should properly and explicitly reflect this important role. This is not the case in the Peruvian legislation.</td>
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<td><strong>Recommendation:</strong> Implement specific regulations in the sector legal framework to ensure security of supply, applying clear defined triggers for public “interventions,” related to i.e., reserve margins, and other important system parameters.</td>
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<th>Strategic priority No. 10: Clarify public sector role and future of SOEs</th>
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<td>As indicated, the previous administration reoriented its policy of promoting private sector investments through public-private partnerships and concessioning, instead of classical privatization processes of selling public assets. The present administration is following this same policy, with an additional ingredient: allowing minority private participation in public-owned enterprises that are selling shares through the stock exchange. This approach has been successful in some particular cases in other countries, like in Colombia with Inteconexión Eléctrica S.A. and other power sector public-owned</td>
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- 136 -
companies. It should be mentioned that Colombia has a long tradition of independent and efficient management of some power sector public-owned companies, in contrast to the case of Peru, where these type of companies are directly controlled by government institutions (like FONAFE, MINEM, and MEF) which appoint their management and dictate their policies on investments and on operating and financial activities.

Also, the present administration has given some indications that public-owned electricity distribution companies should have, in addition to their commercial operations, a social objective in expanding their activities to urban and rural areas without service, and in the case of generating companies, some kind of market regulation role.

All of this shows that in the power sector, the role of the public sector is not as clear as should be. A process to redefine this role doesn’t seem to be in the works either. There are some sector authorities who believe that the sector model -- the initial scheme as well as its 2006 reforms -- is not working and needs to be changed to reinforce the public role, including the role of the public-owned enterprises in the sector.

**Recommendation:** Avoid indeterminate “transitional” management policies of sector SOEs and define clearly their futures.

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**Annex - Electricity System Operations Situation**

In Figures A to F given below, one can appreciate the evolution of the main production and consumption parameters of the Peruvian electricity system recently, in the 10 years from 1998 to 2007. The development of the power capacity in the system since sector reform, from 1992 to 1997, was on the order of 4.6 percent per year, in line with peak demand increases. In the following 10 years, from 1998 to 2007, capacity growth rate went down to only 3.4 percent, being the largest reduction in hydropower capacity expansion (the growth rate of hydro was only 2.7 percent average per year). More recently, only 22 MW of new hydropower generation has been installed since 2005, compared with 778 of new thermal generation.

It is important to notice that generation installed capacity is not a good reference to evaluate the ability of a power system to supply the peak power demand with adequate reliability (with enough reserve to support regular contingencies, like the probability of failure of some power plants). As can be seen by comparing Figures A and B, the total installed capacity in 2007 was 6,021 MW, much higher than the peak demand of 3,966 MW. This does not mean that the system has an adequate reserve of 52 percent.
First, hydropower capacity is limited by water availability; therefore we should look at firm capacity of the system, the capacity during the dry season for hydro plants, and the available capacity for thermal plants (real output of the plants instead of the nameplate capacity). In 2007 the firm capacity of the system was 5,049 MW. Second, the peak power demand is at the delivery end and firm capacity is at the supply end of the electrical system; therefore losses have to be taken into consideration. In 2007 the estimated total losses of the system were 14.3 percent (3.1 percent transmission, 3 percent sub-transmission and 8.2 percent distribution), therefore peak power demand seen from the supply end was 4,533 MW. In conclusion, the system generation reserve during the dry season was only 11.4 percent. This is a low reserve level for a hydro-dominated system.

Source: Author’s calculations.
Regarding electricity production, from the record percentage of hydropower production in 2001 (when it represented 89 percent of the total), this source of energy produced only 68 percent of all the electricity generated in 2007. Thermal generation, on the hand, has been growing steadily since 2001 to reach a record high of 9,047 Gigawatts-hour in 2007, representing a 40 percent increase with respect to 2006. It can be seen from Figure C that this noticeable increment of thermal production started in 2004, coinciding with the beginning of operation of the Camisea natural gas pipeline.

**Figure C: Evolution of system energy production in period 1998-2007**

![Figure C](image)

This situation can be better appreciated in Figure D below, in which is depicted the increase in gas-fired power from 340 MW in 2004 to 1,313 MW in 2007, almost four times as much.

**Figure D: Gas-fired power capacity after Camisea (in MW)**
Regarding the evolution of electricity consumption, as can be appreciated in Figure E, consumption of users of the public service has been growing at an average rate close to 7 percent in the last five years. The consumption in 2007 was 24,621 Gigawatts per hour, 10.5 percent greater than in 2006, indicating an increasing trend in line with the economic grow of the country.

**Figure E: Evolution of energy consumption in period 1998-2007**

*Source: Author’s calculations.*
FINANCING INFRASTRUCTURE DEVELOPMENT

Meeting infrastructure needs will require sustaining a public investment effort well beyond the stimulus package. Over the past 30 years, Peru’s investments in infrastructure have been cyclical, ranging from 0.5 to 2.5 percent of the GDP, with an average of 1.5 percent. More than half of these resources have been invested in the power sector, about a third in transport, and the rest in water/sanitation. This volatility can be largely explained by past policies under which Peru cut infrastructure expenditures in order to facilitate fiscal adjustment in times of economic downturn. As a result, unlike in other LAC countries, the investment levels in Peru are abnormally low. During the same decades, the LAC region as a whole has invested more than 2 percent of GDP in infrastructure, and the investment levels of some countries, like Brazil, even topped 4 percent. As infrastructure investment levels in Latin America are lower than in Asia, Eastern Europe, and South Asia (around 6-10 percent), it is not surprising that Peru ranks low with regard to the quality and availability of its infrastructure services in international competitiveness and investment climate rankings.

The financing gap between Peru and other LAC countries slightly narrowed during the period 2001-2006. With the stimulus package announced in response to the global financial crisis, Peru is now adopting a different countercyclical approach, focusing on infrastructure investment as a way to maintain economic activity and generate employment, while preparing the ground for future growth and enhancing relative competitiveness. As a result of Peru’s stimulus package, investment in infrastructure could exceed 2 percent of GDP in 2009-2010, a level that was only reached in 1981-1983 and in 1996-2000. However, such levels of investment are still relatively modest in the region (in comparison, a country like Chile has been spending an average of 4.2 percent of GDP over the period 2001-2006).

Different scenarios can be used to estimate financing needs. These scenarios could seek to optimize the existing infrastructure stock, close the gap with benchmark countries (e.g., Korea), maintain Peru’s standing in terms of infrastructure efficiency relative to the Latin American average in 2001-2006, achieve social objectives (e.g., MDGs\textsuperscript{147} and compliance with the applicable environmental regulation), seek to achieve universal access by 2016 or match the projected demand for infrastructure services in 2005-2010 (based on macroeconomic modeling). Some of these scenarios are clearly out of reach for Peru. In particularly, it is highly unlikely that Peru will be able to catch up with the Asian Tigers’ leader (Korea), even over a 20-year period. Two years ago, before the stimulus package was designed, Peru was in fact unlikely to meet any of the different investment needs scenarios, even the most modest ones. The infrastructure gap with the Latin American average was still expected to widen and even the long-term infrastructure plans endorsed by the government were unlikely to be implemented. This situation has significantly changed with Peru’s stimulus package which, with two years of investment at 2 percent of

\textsuperscript{147} Stands for Millennium Development Goals
GDP, should be able to raise the average infrastructure spending from 1.1 percent of GDP in 2001-2006 to 1.58 in 2007-2010. Although such spending levels are still below that of LAC regional leaders (e.g., Chile, Colombia), they constitute an unprecedented opportunity for Peru to catch up with the regional average, achieve the MDGs for water and sanitation, and actually implement the priority investments identified in its main planning instruments. However, an important condition for this will be to sustain the current levels of investment beyond the stimulus package. With additional investment effort, Peru could optimize its existing road infrastructure stock, eventually match the projected demand for infrastructure services, and comply with its own environmental regulations for water quality. Finally, a special mention should be made of the relatively modest cost of achieving universal access over the period 2007-2016. However, this scenario is unlikely to materialize due to the current focus of the stimulus package on large-scale infrastructure (“mega projects”) and not on rural infrastructure.

Public spending still represents the bulk of financing, with only 23 percent of infrastructure expenditures coming from private sources. Most of the private financing went to the power sector, as a result of the privatization reforms put in place during the period 1993-1997. Private financing is relatively marginal in transport (4 percent on average over the period 1993-2005) and even more in water/sanitation (2 percent). While a major role should remain for public financing in infrastructure, particularly in rural areas, the level of private financing is lower in Peru than in benchmark countries, and should therefore be increased with more attractive and effective policies and the increased use of PPPs and other innovative financing instruments. The global financial crisis has severely impacted the availability of private financing in the infrastructure sectors as well as the number of project finance transactions. While Peru’s sound macroeconomic framework and sustained economic performance are strong assets to attract private financing in the current context, more efforts need to be undertaken to improve the attractiveness and the stability of the business environment for private investors. As explained above, Peru’s stimulus package includes an ambitious concession program, which, if properly implemented, could provide a solid base for leveraging private financing in the infrastructure sectors.

Finally, the quality of public expenditures in infrastructure could be improved with more predictable budget allocations, the use of performance-based budgeting, as well as the use of innovative financing instruments (e.g., infrastructure funds, guarantees). Such instruments have already been announced (e.g. a US$100 million infrastructure fund managed by COFIDE) or tested (e.g. the 2005 World Bank-financed Guarantee Facility), but have not yet been used to their full potential to leverage private financing. A clear mid- to long-term strategy is still largely missing in this important area.

### Snapshot: Financing Infrastructure Development

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<tr>
<th>Increasing Peru’s capacity to successfully implement the stimulus package</th>
<th>Preparing the ground for the post-stimulus phase</th>
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</table>
| • Seize the current context of the global crisis and of Peru’s relatively strong economic performance to aim at increasing private financing flows in the infrastructure sector  
• Develop the use of innovative financing instruments (infrastructure funds, guarantees) | • Sustain an investment effort in infrastructure of around 2 percent of GDP beyond the stimulus package  
• Focus on the long-term objective of optimizing the road infrastructure stock, of matching the projected demand of infrastructure services and of meeting environmental regulation for water quality  
• Consider achieving universal access to infrastructure over the period 2007-2016 |
PLANNING INFRASTRUCTURE DEVELOPMENT FOR EFFICIENT LOGISTICS

The stimulus package has taken emergency measures to accelerate public investments and cut the red tape. This must now be combined with better project planning and preparation processes. Fast-tracking is an opportunity for Peru to start bridging its infrastructure gap. However, without adequate project preparation, it may undermine the quality of public expenditures, jeopardize social and environmental safeguards, and reduce public consultation. The current fast tracking is in fact cutting many important stages of the preparation process, instead of reengineering it. For example, several major infrastructure projects—such as the IIRSA Sur and Norte and the Huancayo–Huancavelica railway—have been exempted from the SNIP approval process. Better strategic planning, use of service standards, and the preparation of a pipeline of robust and well-designed projects with credible feasibility studies that can pass the SNIP process are still largely missing. These flaws have hampered the design and implementation of Peru’s stimulus package but they could be addressed in time to benefit the infrastructure policies and investments that will follow it.

Good planning practices are crucial to the infrastructure cycle. They should ensure that infrastructure needs are adequately assessed and that investment projects respond to those needs. Project evaluation should help prioritize investment decisions, taking into account environmental and social considerations. Good project preparation is then crucial to reduce the risks of cost escalation and time delays. The governance and institutional culture, coordination among entities and jurisdictions, and allocation of responsibilities between the public and the private sector are three additional considerations that contribute to making a planning process successful. Peru’s current planning practices for infrastructure can still critically improve in all these areas.

The logistics system is essential to handling trade movements but currently shows important weaknesses—especially with respect to transport infrastructure, as well as customs. Peruvian trade represents approximately 41 percent of the national GDP, with volumes expected to grow as a result of the recent Free Trade Agreements (FTA) with China and the United States, Peru’s most important trading partners, as well as other FTAs under negotiation. The prices of minerals and hydrocarbons—Peru’s main export products—are expected to remain high in 2010, ensuring favorable terms of trade for the country. Other export products include agricultural products, fish, produce, and textiles. The main imports are inputs for manufacturing, fuels and lubricant, and capital goods. Most trade flows go through Peru’s ports, Callao in particular, although some transit directly to neighboring countries (Brazil, Chile, and Ecuador). Air transport has shown a sustained increase in freight volumes, pushed by the fast growing trade of specialty agricultural products. In order to remain competitive, Peru needs major infrastructure improvements but also requires improved trade facilitation and business logistics organization. Sound planning instruments are particularly needed in the current context of the economic boom since 2003 and the ensuing high demand for infrastructure. The recent global economic downturn slightly impacted Peru’s trade flow but the need for planning is made even more acute with Peru’s stimulus package and its focus on infrastructure development.

Planning arrangements for infrastructure development do not currently ensure adequate
coordination between the main actors. CEPLAN\textsuperscript{148} was created to fulfill such a coordination function but it has not yet reached sufficient capacity to assume this role. Even within the MTC\textsuperscript{149}, planning remains mostly handled by the modal directorates (roads and railways, civil aviation) and by specialized entities (Provías Nacional, port authorities). The Intermodal Transport Plan, developed in 2007, has not yet had a major impact in defining the investment portfolio. The Ministry of Economy and Finance (MEF) ensures, through SNIP\textsuperscript{150}, that most proposed public investments do comply with a set of requirements but it cannot provide for strategic planning. There is also no or very little interaction between the public and private sectors (with the exception of MINCETUR\textsuperscript{151}). Finally, the planning function at the subnational level also remains extremely weak.

A comparison between Peru’s current planning processes and international best practices suggests targeting three main areas. Peru should first better integrate several planning instruments which currently show weak coordination: transport infrastructure and services, business logistics development, and trade facilitation practices. The updating of the Intermodal Plan and the definition of a network of logistics platforms are important steps in that direction. The second area should aim at developing a new institutional setting through which all key actors would be able to participate in the strategic planning process. A logistics council, as currently implemented by countries such as Australia and Germany, could be created within Peru’s National Competitiveness Council, possibly under the legal form of “Conferencia.” The third area should focus on reinforcing the technical competencies of planning agencies. Planning agencies should be modernized so that they move from the current “investment programming” to true “investment planning.” Such modernization would require a review of key office processes, staff competencies and organization, information systems and planning tools, rules for outsourcing professional services, and adequate levels of budgetary resources.

### Snapshot: Planning Infrastructure Development

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<tr>
<th>Increasing Peru’s capacity to successfully implement the stimulus package</th>
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<tr>
<td>• Create a Logistics Council under the National Competitiveness Council</td>
<td>• Design and implement a new paradigm for trade logistics policy, integrating relevant policy areas that currently show poor coordination</td>
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<tr>
<td>• Strengthen coordination between public and private actors on the issue of logistics</td>
<td>• Modernize planning agencies and build up their technical competence, with the objective of moving from investment programming to investment planning</td>
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<tr>
<td>• Better integrate social and environmental consideration in the decision-making process for infrastructure investments</td>
<td>• Finalize the updating of the Intermodal Plan</td>
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<tr>
<td>• Implement the logistics platform program</td>
<td>• Design a program to support the planning function at the subnational level</td>
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\textsuperscript{148} Stands for Centro Nacional de Planeamiento Estratégico in Spanish (National Strategic Planning Center)  
\textsuperscript{149} Stands for Ministerio de Transporte y Comunicaciones in Spanish (Ministry of Transport and Communication)  
\textsuperscript{150} Spanish acronym for Sistema Nacional de Inversión Pública (National System of Public Investment)  
\textsuperscript{151} Spanish acronym for Ministerio de Comercio Exterior y Turismo, (Ministry of External Trade and Tourism)
THE EFFICIENCY OF INFRASTRUCTURE SERVICE DELIVERY

Infrastructure delivery needs to become entirely more efficient. Efficiency losses are observed at all stages of infrastructure development, from the planning stage to operation and maintenance. At the planning stage, infrastructure investments should be evaluated and alternatives compared with a full consideration of their actual costs. The experience of the IIRSA Sur road, which will end up costing about twice as much as initially anticipated, illustrates how very high contingent liabilities can be generated by poorly designed Public-Private Partnership (PPP) transactions. Similarly, technical standards should be better aligned with the expected benefits, using basic economic evaluation instruments. For example, in the transport sector, paving is not always the optimal solution for low-traffic rural or regional roads. The Peruvian experience has illustrated how well-maintained gravel rural roads can be sustainable and provide access at a low cost, thus allowing improvement of a greater number of rural roads. For regional and national roads with higher traffic, low-cost paving alternatives—such as the technologies currently experimented under Proyecto Peru, should also be considered, with due attention paid to road safety conditions.

Improving the management of SOEs. A significant share of Peru’s water/sanitation and electricity distribution services is operated by State-Owned Enterprises (SOEs). With 79 SOEs owned by the central government, 87 municipal enterprises, and an unknown number of enterprises set up and owned by local governments, the SOE model has been booming in Peru since the late 1990s. Peruvian SOEs are very diverse. In both the water and electrification sectors, there are, on the one hand, strong and highly performing SOEs and on the other hand, highly vulnerable ones, a number of which would go bankrupt if not for their support by public funds. Even though the majority of high-performing SOEs are large, small SOEs also manage to be successful using appropriate business models. For example, despite lower opportunities for economies of scale, the mid-size SEDAM Huancayo has better profitability ratios than SEDAPAL, the largest Peruvian SOE operating in the water sector, while the small EPS SEDACUSCO had the highest performance indicators in terms of service continuity, water and sanitation coverage, amount of unpaid bills, and quality of water treatment. As in many other LAC countries, SOEs that have been partially or fully privatized have generally seen an increase in productivity due to cost reductions and an improvement in terms of the quality of infrastructure services rendered. However, these improvements were mostly observed during the privatization period and tended to be less noticeable afterwards. The regulatory framework for SOEs in Peru is relatively well defined, with the state’s ownership and regulatory functions clearly delineated. The state ownership of SOEs is managed by FONAFE152, an agency which helped ensure efficiency gains. However, the transparency of SOE management remains largely insufficient, with financial statements being disclosed only occasionally, and SOEs’ external auditors designated neither by the SOE board nor by FONAFE. Finally, as for many other LAC countries, finding the right corporate governance arrangements (improved transparency of revenues, more accountable management) is an important issue for SOEs in Peru.

Operational expertise and institutional capacity generally remain low and informality is growing. A majority of service providers in the water/sanitation and electricity sectors are financially and institutionally weak and thus vulnerable, despite all the efforts and resources invested in the past decade to strengthen them. The high rotation of operational staff and managers contributes to weakening the

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152 Spanish acronym for Fondo Nacional de Financiamiento de la Actividad Empresarial del Estado (National Fund for the Financing of State Entrepreneurial Activities)
capacity of many EPSs to modernize. Informal infrastructure delivery becomes a substitute in rural and peri-urban areas when neither the state nor the formal private sector responds adequately to the population’s needs. A number of small-scale local service providers (e.g., sellers of water in jerry cans) offer low-quality and expensive services, sometimes illegally. Many small transport operators provide low-quality and dangerous services in urban areas or for longer distance. Between 1997 and 2003, Peru had one of the highest growth rates of informal workers in the LAC region. While the informal provision of some infrastructure services will often remain the only alternative in the short-to mid-term, particularly in rural areas, some regulation or at least some incentives could be usefully introduced to improve the quality of service provided by the small-scale informal providers.

**The pricing policies for infrastructure services need to be revisited.** With the exception of electricity, infrastructure services in Peru are priced lower than in many benchmark countries. Most toll roads in Peru charge an average of US$0.8 cents per km, significantly less than in neighboring LAC countries like Chile and Colombia. Although the pricing of infrastructure services is generally lower in Peru than in neighboring countries, raising tariffs remains a highly sensitive issue which can generate political and social turmoil. It is difficult for Peruvian authorities to increase the pricing of infrastructure services while the general perception is that both the availability and quality of these services is low. As the situation improves, as a result of the implementation of the stimulus package, the government could decide to revise the current policy and ensure that tariffs cover the costs of infrastructure operation and maintenance. A communication strategy detailing the use of revenues and demonstrating clear gains in terms of service delivery could help generate more support for a rise in tariffs. Improvements in terms of the governance of infrastructure would also be important in order to build such support.

**Inadequate maintenance is a major issue.** As a result of insufficient capacity and revenues, maintenance is often poorly performed, affecting the sustainability of the investments. Some innovative models for operation and maintenance (O&M) such as the Small Towns Pilot Project which is delegating to a specialized operator the O&M of water services in towns with 6,000 to 25,000 inhabitants, or the microenterprises model to maintain rural roads, still need to be fully scaled up. As in many other countries, the maintenance of Peru’s infrastructure has repeatedly been underfunded. In the power sector, Chile and Colombia dedicate nearly three times more financial resources to maintenance per electricity connection than Peru. In the road subsector, maintenance expenditures remain highly volatile, although they should progressively stabilize with the signing of mid-term maintenance contracts on a growing proportion of the national network. Between 1992 and 2005, it has been estimated that the lack of maintenance caused an accelerated deterioration of more than 1,300 km of national roads, generating a loss of US$718 million for the government.

**The governance of infrastructure management could be improved.** Low levels of competition along with political interference in public utilities regulation present liabilities to Peru’s investment climate. Users of infrastructure services and other local stakeholders participate in the planning process for small scale transport and water infrastructure, but they are rarely involved or even consulted in the decision-making process for larger-scale investments. Empowering participatory mechanisms in infrastructure planning and management can be an efficient way to increase accountability. Beyond greater participation of users and stakeholders and increased transparency in performance and financial reporting, better accounting techniques could be implemented, particularly for municipal operators. An example of such techniques is the separation of accounts between revenue collection on the one hand and subsidies on the other. These techniques could lead to improved transparency in terms of tariffs and subsidy policies and a better knowledge of the actual capital and operating costs of service. Finally, corruption is still perceived by entrepreneurs as one of the most important barriers to doing business in Peru. Transparency International ranked Peru 75th out of 180 countries in 2009, at the same level as Brazil and Colombia but below Chile. The issue of corruption has acquired new prominence in Peru in the wake of a corruption
scandal over oil concessions in October 2008, which resulted in the resignation of the entire cabinet. In response, the government has designed an Anticorruption Action Plan whose implementation is being monitored and which will require significant institutional strengthening. The infrastructure sectors are particularly vulnerable to corruption and therefore it is critical that the Anticorruption Action Plan be fully implemented by all ministries, subnational governments, and agencies involved in the management of such investments.

Snapshot: The Efficiency of Infrastructure Service Delivery

<table>
<thead>
<tr>
<th>Increasing Peru’s capacity to successfully implement the stimulus package</th>
<th>Preparing the ground for the post-stimulus phase</th>
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<tbody>
<tr>
<td>• Secure sustainable funding for the maintenance of infrastructure</td>
<td>• Systematically disclose SOEs’ financial statements</td>
</tr>
<tr>
<td>• Reduce inefficiencies in service provision</td>
<td>• Have SOEs’ external auditors designated by SOE board or by FONAFE</td>
</tr>
<tr>
<td>• Consider increasing tariffs for infrastructure services other than electricity, and communicate about the rationale for such an increase</td>
<td>• Better align technical standards with expected benefits of infrastructure investments</td>
</tr>
<tr>
<td>• Better involve users and stakeholders in the planning and regulation process</td>
<td>• Better regulate informal service delivery and establish incentives for informal operators to improve the quality of services</td>
</tr>
<tr>
<td>• Fully implement the Anticorruption Action Plan</td>
<td>• Fully scale up innovative and efficient models for operation and maintenance</td>
</tr>
<tr>
<td></td>
<td>• Implement account separation between collected revenues and subsidies to increase transparency about tariffs and subsidy policies</td>
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DECENTRALIZATION OF INFRASTRUCTURE SERVICES

There is significant evidence that, when properly handled, decentralization can bring about important benefits. In 2002, Peru initiated an ambitious decentralization reform program. Such reforms are particularly needed in a country where about a third of the population and 53 percent of the national GDP remain concentrated in the capital city, Lima. Under a sound environment, decentralization has been found to improve the provision of public goods by tailoring them to local preferences. In Peru, decentralization has also given birth to new ways of operating infrastructure services. Despite these potential benefits, decentralization also presents risks and challenges, such as greater fragmentation of investments and territorial inequalities due to variable performance across territories or capture by local elites. Another risk is that subnational governments drive themselves into unsustainable debt situations. To control such risks, Peru has preferred to implement a gradual approach to decentralization, unlike the “big bang” approach of other countries. Peru’s decentralization reforms have created a three-tier government structure and, since 2002, these reforms have particularly focused on empowering the regional level.
Subnationals’ revenues have increased dramatically but regions and municipalities have little control over them. Subnational governments account for a growing share of non-financial public expenditures and they are playing a greater role in public capital investments. Over the past five years, transfers to regions and municipalities have increased by, respectively, 366 and 170 percent, and in 2008 reached US$700 million in transfers to regions and US$2.78 billion for municipalities. Royalties and corporate income tax from natural resource exploitation activities constitute a large share of their revenues, the rest being intergovernmental transfers from the central government. The greatest increases were observed in regions with important mining revenues. This increase is likely to continue and even accelerate, as a number of major mining investments are expected to be implemented in regions such as Cajamarca, Junín, Apurímac, Moquegua, Loreto, and Cusco. Subnationals cannot modify the rates and bases for local taxation or create new taxes, resulting in little control on their revenues. Subnational borrowing also remains marginal. Public debt is at 93.4 percent owned by the national government and only four regions have contracted debt. However, some debt is unregistered and several Peruvian municipalities do not comply with the Fiscal Responsibility and Transparency Law. The Peruvian MEF is both cautiously exploring developing subnational borrowing with the help of multilateral partners (World Bank – IFC) and trying to introduce a greater regulation of subnational debt. While a wide opening to subnational borrowing may trigger significant risks, the most advanced regions could benefit from this possibility to leverage additional resources to invest in infrastructure. In addition, borrowing from the market would promote discipline in fiscal and financial management. Six Peruvian regions look particularly ready to absorb more resources because of their budget execution performance as well as their institutional capacity: Lambayeque, Cusco, Cajamarca, San Martin, Junín, and Loreto.

Many regions have difficulties spending their current resources. The investment budget of regional governments has more than quadrupled in six years to total US$770 million in 2009. Transport and irrigation together represent half of the regions’ investments. However, many subnational governments have difficulties spending their growing revenues. Ten Peruvian regions in 2008 spent less than half of their budget resources. On the other hand, some Peruvian regions have a better track record in terms of budget execution and they could still absorb more resources. Key bottlenecks to efficient spending include an excessive fragmentation of investments and the poor quality of pre-investment studies. Although they have been almost entirely phased out at the national level, inefficient force account practices are widely spread at the subnational level. Instances of poorly managed contracting arrangements are also relatively common. Institutional capacity also remains low with organization shortfalls and duplication of responsibilities, as well as an overly fragmented municipal sector, lack of technical skills and management tools, saturated legal services, too-frequent staff rotations and unattractive compensation policies. Finally, the decentralization of SNIP has so far failed to improve or even preserve the quality of infrastructure.

Building greater capacity at the subnational level should remain a top priority of Peru’s decentralization agenda. In the rural road subsector, the successful experience of the Provincial Road Institutes should be fully scaled up to overcome the high fragmentation of the municipal sector. The evolution of such institutes toward the model of the Provincial Infrastructure Institutes could also be considered by other infrastructure sectors to expand the benefits of such institutional model. In the short term, Infrastructure Management Committees could be created by municipalities in order to have a better overview on infrastructure spending, enhance the quality of such investments, and resolve bottlenecks to implementation. At the regional level, the redundancies caused by the existence of both gerencias (director’s office) and sector directorates need to be urgently solved. Several organizations could be developed based on the model of “special projects” in order to create regional Infrastructure Institutes, as
envisioned by the region of Cajamarca. The central government could also introduce additional incentives to reward good performance of subnational governments, and to better tailor its institution-building programs. The functioning of FONIPREL\(^\text{153}\) could be revised, with the introduction of a performance-based categorization of regions to concentrate resources on the best performing regions while an aggressive technical assistance program would be implemented in the weakest ones.

**Another desirable evolution of Peru’s decentralization reforms is the introduction of a territorial development approach that would go beyond fiscal decentralization considerations and sector-based policies, to look at the development of territories in a comprehensive, long-term, and strategic manner.** Developing a network of connective infrastructures to facilitate the flows of goods and services across the national territory, facilitating the mobility of people, and promoting urbanization processes that would lead to strengthening not only Lima but also a network of secondary cities could all be part of a broad territorial development agenda. Important lessons could be drawn from the experience of other countries in this area, such as Chile’s Rural Infrastructure for Territorial Development program. However, this would first require that Peru find an appropriate champion to lead this territorial development agenda. Possible alternatives include: the Decentralization Technical Secretariat (STD); the MEF- FONIPREL; CEPLAN; a financial intermediation institution; or a sector-specific institution. In choosing this “leader,” Peruvian authorities would have to assess institutional leadership, actual resources, and mandates, but also results achieved, as well as credibility and quality of established relations with subnational governments. Another approach, in case no national champion can be found, would be to work directly with individual regions that have demonstrated leadership, capacity and interest for territorial development.

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**Snapshot: Service Decentralization**

<table>
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<tr>
<th>Increasing Peru’s capacity to successfully implement the stimulus package</th>
<th>Preparing the ground for the post-stimulus phase</th>
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<tbody>
<tr>
<td>• Promote the establishment of Infrastructure Management Committees</td>
<td>• Start piloting the evolution towards Provincial Infrastructure Institutes</td>
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<tr>
<td>• Cautiously explore developing subnational borrowing, starting with the six Peruvian regions that could best benefit from such a possibility</td>
<td>• Improve subnational debt registering and enforce compliance with the Fiscal Responsibility and Transparency Law</td>
</tr>
<tr>
<td>• Design a program supporting the preparation of high quality pre-investment studies for infrastructure investments at the subnational level whose implementation could be financed from a variety of financing sources</td>
<td>• Promote infrastructure planning approaches that limit the fragmentation of investments by rewarding investments of territorial relevance and of a sufficient scale</td>
</tr>
<tr>
<td>• Design incentive programs to continue phasing out ineffective force account practices</td>
<td>• Pilot a territorial development approach, based on the successful experience of Chile, after having identified the right champion to lead that agenda in Peru or through working with individual regions</td>
</tr>
<tr>
<td>• Revise the functioning of FONIPREL with greater consideration of the relative performance of regions</td>
<td>• Design and implement a program to build the capacity of the decentralized SNIP</td>
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</tbody>
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\(^{153}\) Spanish acronym for *Fondo de Promoción a la Inversión Pública Regional y Local* (Regional and Local Investment Promoting Fund)
PRIVATE SECTOR PARTICIPATION IN INFRASTRUCTURE

Private sector participation has increased and has yielded generally positive results. Peru has been at the forefront of Latin American countries opening infrastructure to private sector participation through, in particular, the use of public-private partnerships (PPPs). In the power sector, 70 percent of firms generating capacity are owned by private operators, as well as the totality of the high voltage transmission system. Following the privatizations of the 1990s, distribution losses decreased from 20 to 8 percent over the period 1995-2007. In the transport sector, an ambitious roads, ports, and airports concession program is being implemented with major progress to date. Private participation in roads management resulted in both the improvement of road conditions and in the provision of new services to road users. For example, the concession between Ancón and Pativilca brought sound routine maintenance and improved signalization, but also emergency telephone services, which are connected to ambulance services or mechanical help centers. The concession of the Panamerican roads segments and the IIRSA North has already shown significant benefits -direct and indirect- and reduction of logistic costs. The concession of the Lima airport is performing according to expectations after a number of difficult years and contract renegotiations. The water and sanitation sector remains the least advanced in terms of private participation, with only three concessions awarded to date. In 2008/9, Peru established a new legislative framework for PPPs, which, together with good litigation track records and a stable macroeconomic environment, started to attract more sophisticated international investors. The PPP program has also developed a few innovative finance instruments such as the CRPAO\textsuperscript{154} and the payment by taxes that can be quite effective in certain contexts.

A number of PPP transactions have experienced significant difficulties however. Successful PPPs in Peru have been achieved through sound project development processes (including effective risk allocation and efficient contract structures), coordination among public actors, and strong competition. But unfortunately, a number of transactions, some of them quite important and visible (LAP, IIRSA South, Taboada, Olmos, etc.) have been less successful. Key contributing factors have tended to include the lack of robust feasibility studies, poor coordination among key public entities, poor contract design, questionable risk allocation, hurried processes, and strong political interference. This experience highlights the need for enhanced cooperation among public actors, integrated project management, capacity building activities, good governance, accountability, streamlining of procedures as well as sound communication and consultation mechanisms.

Peru’s PPP program has not yet matured and reached steady state despite twenty years of experience. Despite nearly 20 years of experience, Peru keeps struggling to move forward with its PPP program. Evidence for this includes the limited number of projects awarded annually (1 to 3), the length of time required to prepare projects, recurrent problems and acrimonious relations with the private sector, as well as periodic legislative changes. Bringing a new project to market is a struggle when it should by now be a quasi-routine business. In order to further leverage private sector participation, Peru will need to work in three policy areas: (i) enhancing its legal and regulatory framework; (ii) strengthening its institutions and reducing personnel turnover; and (iii) streamlining the PPP process, including improving contract design, PPP procedures, procurement processes and contract management.

\textsuperscript{154} Government debt obligation issued to the private party under a PPP for the successful completion of specific public works.
Peru’s new PPP legislation still needs to be fully implemented and does have some important lacunas that need to be addressed. The Peruvian legal framework remains highly complex, fragmented, and unstable, which may deter some international investors. Improving the legal stability, the scope and clarity of the PPP legal framework should be considered a priority for Peruvian policy makers. The PPP law and its secondary regulation introduced public investment decision-making based on value for money (with project-cycle cost-benefit analysis and public sector comparator). However, this has generated controversy and, as a result, the implications of these principles still need to be translated into processes and regular practices. Peruvian authorities should therefore pursue their efforts in developing and publishing clearer PPP policies and guidelines. For example, the methodology for running the comparator has still not been published by MEF. There is also a lack of clarity regarding jurisdiction for classifying projects as self-sufficient, in particular subnational governments’ projects and also regarding the responsibility in the event of a revenue shortfall. The issue of unsolicited proposals remains contentious and needs revisiting. According to the PPP law, unsolicited proposals have to be self-sustainable and therefore cannot be funded from public resources, although non-financing guarantees can be granted for up to 10 percent of the total cost for the first five years of operation. This is a cautious approach, made necessary by the asymmetries of information between the public and private sector, to limit the opportunities for capture and rent transfers and the possible risk of excessive contingent liabilities. The PPP law has substantially increased the role of the MEF, and decreased that of ProInversión, with a view to control the fiscal risk of unaccounted contingent liabilities. However, the methodology which has been developed to assess contingent liabilities is still pending implementation. PPPs should be classified according to the extent of risk retention by the public sector rather than the scope of public guarantees. Non-financial guarantees should be better assessed, since contractual commitments have generated the largest cost overruns in Peru’s PPPs.

The institutional framework involves a complex network of public actors and there is an urgent need to improve the governance of the PPP program. Institutions involved in PPPs include line ministries (MTC\textsuperscript{155}, MINVIV\textsuperscript{156}, MINEM\textsuperscript{157}), the Ministry of Economy and Finance, regulators (SUNASS, OSINERG, OSITRAN), the promotion agency (ProInversión), the Controlaría as well as other public agencies such as FONAFE. The new PPP law has reduced the autonomy of ProInversión and seeks to empower line ministries and subnational governments, as they now are entitled to implement their PPP projects without going through ProInversion. However, the capacity of such institutions to handle and design PPP transactions remains quite limited, particularly at the local level. There is still a lack of clarity regarding the jurisdiction of the different institutions in the PPP program. Also, ProInversión is not yet a true PPP unit. Instead, it remains by and large a national promoting agency, influenced by its original function\textsuperscript{158} of privatizing SOEs and with a strong transaction-oriented culture. Its technical capacity is limited in certain areas, and its high turnover rate is a very serious concern. In its last four years it has had five different Executive Directors, and a substantial turnover of intermediate level staff. On the other hand, regulators – who are among the most advanced in the LAC region due to their transparency practices in particular - now have diminished authority and appointments to their Board of Directors are riddled with political interference. In sum, the current institutional complexity produces a segmented approach to the PPP development process and prevents synergies. Insufficient communication...
and public participation have also resulted in a lack of public support for some PPPs. This in turn has generated conflicts and implementation delays on some occasions and has often hampered the transfer of risks to the private sector.

**Lack of standardization of the PPP program: contract design, procedures, procurement processes and contract management need to be significantly improved.** This is a critical and major flaw of the Peru PPP program. The processes to bring a PPP to market are extremely cumbersome, lengthy and inefficient. Procurement processes have started with incomplete technical feasibility analysis and the bidding schedule has often been unrealistic, with multiple postponements increasing uncertainty for potential bidders. Bidding processes have so far suffered from low levels of competition, which has generated supply-side constraints to the scaling up of infrastructure programs. Contract renegotiations have been a constant and have so far been detrimental to the public sector. Renegotiations have favored opportunistic behaviors and have led to some discouragement on the part of experienced international investors. The streamlining and standardization of PPP processes ought to have the following elements: i) contract standardization and model clauses should be promoted, based on best practices, and guidelines explaining how to select procurement methods for public infrastructure projects could be usefully developed; ii) setting up of “virtual” project teams including one member for each relevant institution (Line Ministry/Subnational government, MEF, Pro-Inversion, Regulatory Agency, Contraloria); iii) streamlined and time bound procedures to reduce delays and induce compliance; iv) use of multiples windows depending on project size and context, with less onerous processes for smaller projects; v) the implementation of a risk management unit at the MEF to take responsibility for the financial decisions; vi) clarification of jurisdictions, so entities only comment on matters within their competency; vii) the use of external expert panels to validate economic and feasibility analysis, so that public servants are protected from future law suits. Regulators should also advise early enough on contract design to better reflect lessons learned and avoid future conflicts and ex-post contract management problems. Regarding contract management, regulatory bodies need to be strengthened: they require experienced personnel with the knowledge to handle relations with the private sector, computerized tools, regulatory instruments and redesigned internal processes. There is also a need to move towards performance-based contracts and output-based infrastructure services. The corresponding regulatory tools ought to be developed.

**Better attention to social issues and improved communication.** These were two of the critical factors absent from the PPP Peru program in the past, which explains to a large extent the backlash against PPPs. Project design rarely addressed social issues – for example through social tariffs or access subsidies - sometimes because it was mistakenly believed that tariffs would substantially decrease under PPPs. Also the government did not implement an effective communication campaign to inform its citizens of the reasons behind the PPP program, or of the benefits secured. Likewise consultations with affected communities were not the norm, creating increased polarization and so on. Moving forward, it is imperative that social issues be explicitly addressed, that an effective communication strategy with periodic briefings to all relevant stakeholders be implemented, and that the involved communities be brought in early enough and that their buy-in be secured. All these are critical ingredients for the success of a PPP program.

### Snapshot: Private Sector Participation

<table>
<thead>
<tr>
<th>Increasing Peru’s capacity to successfully implement the PPP program</th>
<th>Preparing the ground for the PPP program post-stimulus phase</th>
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<tbody>
<tr>
<td>• Promote greater coordination among public actors</td>
<td>• Promote the preparation of a pipeline of robust and</td>
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- 152 -
involved in PPPs for example through establishing “virtual” task forces for specific PPP transactions
- Develop and publish clear PPP policy guidelines that can help effectively implement the principles already stated in Peru’s legal framework for PPPs
- Fully implement the methodology to assess contingent liabilities, including from non-financial guarantees
- Strengthen ProInversión’s capacity
- Design and implement a communication strategy for PPPs
- Ensure that bidding schedules for PPP projects are more realistic
- Account for social issues when designing PPPs
- Set up a risk management unit in MEF
- Clarify the jurisdictions of institutions involved in PPPs

well-designed projects with credible feasibility studies that can pass the SNIP process
- Publish and disseminate the methodology needed to use the public sector comparator
- Strengthen the institutional capacity of regulators so that they can better guide the design of PPP transactions and better ensure that contractual obligations are actually implemented
- Promote PPP process standardization, including model contracts and clauses, streamlining of procedures and time bound decisions
- Prepare and publish guidelines on the selection of procurement methods for PPPs
- Ensure that regulators advise early enough in contract design
- Develop a methodology to design performance-based contracts and to supervise output-based infrastructure services

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Each infrastructure sector will also require the implementation of a set of specific policies. The previous recommendations are addressing issues that cut across the three infrastructure sectors. In addition to these cross-sector recommendations, some other actions can be identified in order to address issues and policy challenges that are sector-specific. Although they can be gathered under the same umbrella term of infrastructure, the transport, power, and water and sanitation sectors are very different. In Peru, institutions in charge are distinct for the three sectors. The levels of involvement of the private sector, and the potential for decentralization reforms vary. Finally, the existence of network effects will unevenly affect the marginal costs of expanding access in the different infrastructure sub-sectors.

**WATER / SANITATION**

Water and sanitation service coverage and quality still lag behind the Latin American average. In addition to rural areas, low coverage ratios are mostly observed in peri-urban areas. The limited coverage of sanitation services is causing environmental damage, as only a small proportion of wastewater is adequately disposed and there is an uncontrolled reuse of effluents for irrigation purposes. Service continuity is low with a national average of 18 hours a day (less than in Colombia, with 20 hours a day). The quality of water services is particularly poor in the 500 districts where they are operated directly by the municipalities. Maintenance is also an issue since many recently built or improved infrastructures deteriorate soon after construction, especially in small towns and rural areas.
Despite the recent concentration of responsibilities in the Ministry of Housing, Construction and Sanitation (MVCS), all actors involved still need to improve their performance and to better coordinate among themselves. The MVCS needs to promote efficient service delivery and transparent allocation of resources, SUNASS needs to effectively regulate service providers and enforce compliance with standards while providing incentives to foster efficiency, and EPSs and other water and sanitation service providers need to start preparing for the new challenges ahead, in particular the impacts of climate change. Peru contains roughly 71 percent of the world’s tropical glaciers, but these have lost about 22 percent of their surface since the 1980s, resulting in dramatic changes in water flows to Andean valleys.

The current government’s objectives are to meet the Millennium Development Goals and possibly even exceed them as early as 2011, but the EPSs may not be ready for it. After very low levels of investment in the years 2000 to 2006, an aggressive investment program has been designed under the 2007 PAPT (Water for All Program). Under this program, the central government subsidizes 75 percent of most investments in the water utilities service areas. While this program is channeling increased funding to the sector, there are some concerns about the sustainability of the investments. Many EPSs and smaller providers have been forced to implement these investments and take over the new infrastructure even though they were unprepared to do so: in some cases, these providers made the investments without the approval of their Boards of Directors and very often they need to improve their administrative, operational and commercial practices substantially.

In terms of efficiency, operating performance, as measured by productive efficiency, remains low. Productive efficiency amounts to 1.58 m$^3$ of water produced per m$^3$ billed for SEDAPAL and to 1.91 for other EPSs in 2007. Other performance indicators are also poor (low productivity and high levels of unaccounted for water), as is the financial performance of the average Peruvian water utility. Finally, the decentralization process is still incomplete and slower to implement than expected, although the provision of water and sanitation services is, in theory, decentralized to municipalities.

Water tariffs have been maintained at the same levels since 1996, with the exception of SEDAPAL’s tariffs, and they are not sufficient to cover the high operation and maintenance costs. In theory, water tariffs are set according to technical considerations and following a methodology set by SUNASS. In practice, however, tariffs are set by the highly politicized companies’ boards, subject to SUNASS’ approval, so they are still largely determined by political considerations.

Private sector participation in the water/sanitation sector remains marginal. The first concessions were signed in 2005 and a number of other concessions under preparation have been aborted, although the legal framework allows for several PPP models. Even though other concessions have performed well, the mixed experience of the Tumbes concession has affected the credibility of PPPs in the sector. This experience highlighted the need to train local stakeholders in managing the concession contract, using all the tools provided for by the contract. In rural areas on the other hand, successful private sector participation has been piloted in smaller cities, under the PRONASAR program.
**Snapshot: Water and Sanitation Sector**

<table>
<thead>
<tr>
<th>Increasing Peru’s capacity to successfully implement the stimulus package</th>
<th>Preparing the ground for the post-stimulus phase</th>
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<tbody>
<tr>
<td>• Make execution of investments more agile and prevent the possible saturation of executing agencies by implementing aggressive institutional strengthening of VMCS, DNS, SUNASS and EPS</td>
<td>• Develop specific strategies adapted to different types of markets (incl. dispersed populations), promoting the use of appropriate technologies (e.g. individual sanitation solutions) and ensuring effective access to services by the beneficiary population</td>
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<tr>
<td>• Complement infrastructure investments with “software” investments to ensure sustainability</td>
<td>• Target interventions to reduce socio-economic disparities, using the region as the planning unit</td>
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<tr>
<td>• Develop a sector-wide training program with courses for utility managers and peer-to-peer learning</td>
<td>• Develop the sector’s information system</td>
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<tr>
<td>• Increase the beneficial impacts of water and sanitation provision through hygiene promotion, sanitary and environmental education</td>
<td>• Private initiatives with demand for reuse should develop their own treatment capacity</td>
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<tr>
<td>• Foster PPPs for addressing specific performance needs and/or to improve operational efficiency, beyond DBOs and DBOTs</td>
<td>• Adopt a gradual approach to discharge standards, supported by strong monitoring of water quality</td>
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<tr>
<td>• Develop a uniform financial policy and a transparent allocation mechanism to EPSs based on financial and operational performance improvements. Investments financed by the central government should be part of the PMO, approved by SUNASS 159, and linked to tariff adjustments to promote the financial sustainability of utilities. SUNASS should strengthen its control function and impose a change of management in EPSs that cannot provide services meeting minimum standards. Co-financing with subnationals should be promoted under uniform sector programs and policies</td>
<td>• Promote the importance of preserving/saving water</td>
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<tr>
<td>• Strengthen water user associations in concentrated rural areas and promote multi-village schemes</td>
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</tr>
<tr>
<td>• Complete the separation of functions within the sector, including the development of a transition period to decentralize SEDAPAL</td>
<td>• Explore the option of developing OBA schemes (e.g. for leak reduction programs)</td>
</tr>
<tr>
<td>• Scale up pilot projects developed under the Rapid Glacier Retreat project in other sensitive watersheds</td>
<td>• Move ahead with preliminary treatment followed by a submarine outfall for Taboada and La Chira</td>
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**TRANSPORT**

**Improving access and integration remains a pending challenge for the transport sector.** Paved road density in Peru (317 km per million people) is among the lowest in South America. Moreover, 15 percent of the paved roads and 63 percent of the unpaved network remain in poor or very poor condition. Isolation is a strong challenge for rural areas.

**The decentralization reforms have been particularly successful in the rural road subsector but they still need scaling up.** Over the past 15 years, about a third of Peru’s rural road network has been improved and maintained by community-based microenterprises, with management responsibility transferred to municipalities. A successful institutional model (the Provincial Road Institutes) has been created. The cost of scaling up this successful experience to a larger share of the rural roads network is relatively modest compared to the large investments considered under the stimulus package. On the other hand, the full decentralization of regional roads management to regional governments is still lagging on.

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159 SUNASS is the National Superintendency for Sanitation Services
behind. Many regions now have access to significant resources but are still missing sound planning and management tools, and still have limited institutional capacity.

**Despite recent progress, road maintenance remains a critical issue.** The stimulus package prioritizes large investment projects, and rehabilitation and maintenance costs may be the first expenditures to be downsized if fiscal constraints or contingent liabilities materialize. Only 34 percent of the total road network receives some kind of maintenance and just 12.5 percent can count on a permanent maintenance system. A broader use of the long-term, performance-based maintenance contracts recently piloted by Provías Nacional on the national network could help secure a permanent maintenance system. CREMA contracts could also be valuably piloted on a few segments of the national road networks. One positive step has been the *Proyecto Peru*, a program aimed at improving selected road corridors with the use of low-cost paving technologies, combined with five years of maintenance. However, this program still needs to pay adequate attention to road safety considerations. On the secondary and tertiary road networks, the full scaling up of the highly successful microenterprise program could also help improve the sustainability of such infrastructure.

**Road safety is one of the highest challenges in the road subsector.** With 3,500 deaths annually and 47,000 people injured in 75,000 car accidents, Peru ranks very low among Latin American countries in terms of road safety. Speeding, recklessness, and inebriety, along with a lack of effective regulation of the vehicle fleet, and poor road quality, are the most important factors in the current state of road safety. According to a recent road safety assessment performed by iRAP (International Road Assessment Programme), about 22 percent of the Peruvian roads can be considered highly dangerous for car users and 63 percent to pedestrians. Important steps have been accomplished by the Peruvian authorities, such as the approval of the 2007-2011 National Safety Plan, the reactivation of the National Road Safety Council, the creation of SUBTRAN (Transport Subsecretariat) or the “Tolerancia Cero” (Zero Tolerance) Plan. However, these measures have so far failed to limit the number of crashes. The lack of an effective lead agency that can set policy and direct implementation to oversee the achievement of results remains the most urgent challenge to resolve. The role of SUBTRAN relative to other areas of MTC still needs to be clarified. Tougher vehicle regulations could encourage the replacement of old public transport vehicles. A safe corridors pilot program could also help achieve demonstrative results through greater synergies between the various sector policies, and help further dissemination of best practices.

**The performance of logistics in Peru is generally low, with very high logistics costs.** The lack of strategic planning instruments is a major hindrance in addressing the logistics challenge in a consistent and effective way. The port sector is a particularly critical bottleneck to Peru’s competitiveness. Port capacity is constrained, and the concession of *Muelle Sur* will only temporarily help meet the growing demand for port services in Callao, Peru’s largest port. A study should be launched to assess the best location for a new port to handle cargo and containers once Callao has become fully saturated. International indicators rank Peruvian ports low with regard to the speed, reliability, and security of port services. It has been estimated that ENAPU’s cost structure could be halved with the same level of activity. A reform program should be designed to help raise the efficiency of ENAPU. Railways are becoming of higher importance for transporting minerals from the mines to the ports. River-based transport is an important option in the Selva and river ports there have seen their rates of activity growing over recent years.

**Private sector participation in the transport sector is substantial but a new generation of PPPs**

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160 Spanish acronym for Empresa Nacional de Puertos S.A. (Ports National Company)
should be designed. Nine road corridors have been concessioned, totaling 4,000 km of the 7,000 km the government aims at achieving in the short to mid-term. Besides, railways have all been concessioned, which has resulted in a significant improvement in the quality of services. An ambitious concession program has also been launched in ports and airports and should be expanded in the context of Peru’s stimulus package. While private participation in transport has generally been positive, one major project (IIRSA Sur road) has resulted in dramatic cost overruns for the public sector, suggesting that such PPP arrangements need to be cautiously managed. The Lima airport LAP concession was a major and continuous source of conflict and with significant delays on investments. Other investments under Peru’s stimulus package (such as the IIRSA Centro road) should offer an opportunity to take stock of lessons learned and build a new generation of PPPs. Finally, the pricing of transport services could be revised to generate additional revenues for the sector since fees for toll roads are lower than in other Latin America countries.

Snapshot: Transport Sector

<table>
<thead>
<tr>
<th>Increasing Peru’s capacity to successfully implement the stimulus package</th>
<th>Preparing the ground for the post-stimulus phase</th>
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<tbody>
<tr>
<td>• Complement the “mega-projects” with an ambitious road asset management program, including piloting CREMAs and with securing funding for maintenance at both the national and the subnational level</td>
<td>• Fill regulatory gaps with a comprehensive strategy for transport regulation</td>
</tr>
<tr>
<td>• Continue piloting and scaling up the low-cost paving program being implemented under Proyecto Peru</td>
<td>• Consider creating a Consultative Commission for Transport to help improve coordination between sectors and transport modes</td>
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<td>• Invest more in rural roads</td>
<td>• Streamline the logistics dimension into strategic planning for multimodal transport investments and update national road plans with a view to better identify key corridors that could become saturated in the short to medium term</td>
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<tr>
<td>• Strengthen mechanisms aimed at improving the quality of infrastructure investments, particularly on public finance and safeguards issues</td>
<td>• Scale up the rural roads program so that half of the network is in good condition by 2015 and all district municipalities are linked by roads in good condition</td>
</tr>
<tr>
<td>• Execute in 2010 the investment program identified through iRAP on at least 2,500 km of roads and implement a demonstrative “safe corridors” program</td>
<td>• Help establish full capacity provincial road institutes in all 194 Peruvian provinces by 2012</td>
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<tr>
<td>• Build a lead road safety institution, possibly articulated around the National Road Safety Council</td>
<td>• Build a culture of safe road design and usage</td>
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<td>• Clarify the role of the newly created SUBTRAN and its relations with other areas of the MTC</td>
<td>• Implement a results-focused approach through enhanced monitoring and evaluation, in order to achieve the long-term objective of crash reduction</td>
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<td>• Enforce tougher vehicle regulations to encourage the replacing of old public transport vehicles</td>
<td>• Ensure a better “port-city” integration, taking into account the rapid growth of Callao</td>
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<td>• Assign clearer responsibilities to the various institutions in charge of PPPs in transport</td>
<td>• Design and implement a reform program to raise the efficiency of ENAPU</td>
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<tr>
<td>• Successfully conclude some of the PPP transactions under the stimulus package so that they can become benchmarks for a second generation of PPPs</td>
<td>• Launch a study to assess the best location for a new port to handle cargo and containers once Callao has become fully saturated</td>
</tr>
<tr>
<td>• Tailor regional assistance programs and provide greater incentives for more effective management of transport expenditures (including a phase out of force account practices, with the only eventual exception of emergency maintenance)</td>
<td>• Actively promote research/innovation in transport, create a transport statistics unit within MTC and strengthen MTC’s information systems</td>
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POWER

The reform and restructuring implemented in the years 1991-1993 led to a privatization and concession process that transferred major sector assets from public to private hands, together with the management and operation of the main electricity facilities, with the exception of electricity distribution outside of Lima and Ica. A modern legal and regulatory framework was established through the 1992-93 Electricity Concession Law. This framework specifies the methodology for rate setting, the granting of concessions, customer service guidelines, and accountability of the operators, and changes the role of the state from owner and operator to policymaker, rule maker and regulator. The reform, together with increased private participation, resulted in significant improvements in terms of efficiency. Distribution losses in particular decreased from 20 percent in 1995 to 8 percent in 2007.

Investments dropped sharply in the early 2000’s. Sector authorities became concerned by a sharp drop in investment, from US$760 million in 1999 to US$230 million in 2003, and the Law No.28832 was passed to “Ensure the Efficient Development of Electricity Generation.” However, detailed regulations and some measures of this law, such as long-term supply auctions and transmission planning, which have been recently implemented, still need to be tested in practice. The government has taken ad hoc emergency measures (such as Emergency Decrees No. 037-2008 and No. 049-2008) to address the most urgent needs but some of these measures affect the basic principles of the 1992-93 legal framework. A comprehensive re-examination of the applicable legal and regulatory framework is therefore still needed.

In 2008, Peru faced a critical situation in terms of energy supply with a low reserve margin of only 16 percent. Peru is favored with abundant sources of energy, mainly from hydropower and natural gas (Camisea being the largest field). Electricity production has been growing steadily since 1992 to reach 28,133 GWh in 2007, of which 68 percent came from hydro resources. Self-generation is significant, at 21 percent of total electricity generation. However, investments in the sector have been insufficient to match the evolution of the demand. Consumption is growing fast, driven by fast economic growth, and amounting to 24,621 GWh in 2007, of which 55 percent was industrial and 24 percent residential. The future activation of several gas-fired thermal units under construction should bring the reserve margin back to 30 percent. However, in order to keep its energy supply growing, Peru will need to increase its attractiveness for private capital and in particular consider more efficient pricing policies. It is in particular essential to ensure that the required production and transport capacity of the Camisea gas pipeline matches demand as much as possible. The “promotional price” of the natural gas from Camisea should also be limited in time and scope in order not to generate distortions in thermal generation (and affect competitive alternative sources of energy like hydropower generation). Public support for further privatization in the sector remains low following the 2002 cancellation of the privatization of Egasa and EGESUR, two generation companies servicing Arequipa, Moquegua, and Tacna. Peruvian authorities are now considering other types of private sector participation, including concessions and PPPs. Recently, two new private companies have also appeared in electricity generation.

It is estimated that in order to match electricity demand, no less than US$2.25 billion of investment in new generation, transmission, and distribution infrastructure will have to be mobilized in the coming five years, excluding the required investments in rural electrification and funds for repairs and upgrading of existing assets. This means sustaining a level of investment of about US$600 per year. In comparison, total investments in the sector were highly volatile over the period 2000-2007, ranging

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161 In 2008, the electricity production was 30,829 GWh (Giga Watt hour)
from US$235 million in 2003 to US$699 million in 2007. A large part of this new investment amount would be expected to come from the private sector. Temporary transmission programs designed by MINEM should be continued through the intervention of ProInversión. As in other countries, an Independent Market Monitoring group should follow electricity market behavior and make recommendations.

**Because of underinvestment in maintenance and upgrading of distribution systems, the quality of electricity services has been deteriorating in recent years with an increase of the frequency and duration of power cuts, particularly outside Lima.** Distribution companies are either private (with 1.92 million customers) or SOEs (2.43 million customers). As part of the decentralization process, the government is considering transferring ownership of the regional distribution SOEs to regional governments, beginning with Arequipa and Cusco, where such a transfer has been a long-sought regional request. Regions have increasing resources for electrification projects (particularly Ayacucho, Cajamarca, and Puno). Under the decentralization process, sub-national governments also participate in the planning of rural electrification projects. However, if the process of transferring responsibility for distribution to regional governments is improperly handled, significant difficulties could be created for the corresponding SOEs, as regions currently lack the technical and managerial expertise to take over this new responsibility. More generally, the public sector role and the future of SOEs needs to be clarified.

**While access to electricity services is generally satisfactory in urban areas, rural access remains a major problem in Peru.** In 2008, about 5.7 million Peruvians, mostly from poor rural areas, did not have access to electricity services. While coverage reached almost 100 percent of the population in Lima, it was only 40 percent in Cajamarca. At 32 percent, coverage in rural areas was one of the lowest in Latin America. Distribution companies hold concession areas around urban centers and are only obliged to meet service requests within 100m of the existing network. There are currently two models used by MINEM for expanding electrification services in rural areas: one, the classical DP approach for “social-based” projects, and the other, supported by the World Bank, aimed at promoting the implementation and operation of “financially sustainable” rural electrification projects by the distribution companies. In the first model, rural electrification projects are 100% financed by the DP and then transferred either to distribution companies or to the SOE-holding company, ADINELSA. In the second model, distribution companies propose and construct projects and receive a partial subsidy from MINEM that ensures an adequate return on the investment made by the distribution companies. MINEM has also initiated promotional actions to increase the average electricity consumption for productive uses. The government aims to increase rural coverage from 30 to 80 percent by 2015. This will require sustaining a level of investment of US$93 million annually until 2015, requiring that budget resources be added to the US$40 million provided by the existing Rural Electrification Law.

### Snapshot: Power Sector

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<tr>
<th>Increasing Peru’s capacity to successfully implement the stimulus package</th>
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<td>• Implement specific regulations in the sector legal framework to ensure security of supply, applying clearly defined triggers for public “interventions,”</td>
<td>• Implement a more consistent energy and electricity planning framework in the sector with an effective monitoring process</td>
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</tbody>
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162 Dirección de Proyectos
related to reserve margins and other important system parameters
- MINEM and OSINERGMIN should closely follow the behavior of the electricity market for large users, which represent about 50 percent of the total demand of the country
- Implement the most important measures to improve generation availability and other complementary emergency actions
- Ensure that required production and transport capacity of the Camisea gas pipeline match demand as much as possible.
- Consider limiting in time and scope the “promotional” price of the natural gas from Camisea, in particular to the electricity sector, to avoid efficiency distortions in thermal generation and additional barriers to competitive alternative sources of energy like hydropower generation
- Clarify public sector role and future of SOEs
- As much as possible expand all electrification programs to increase access, in particular to rural and marginal urban areas

- Explore the option to institutionalize planning in a specialized independent planning unit
- Complete the regulatory framework established in reform law 28832, issuing all detail regulations and norms and avoid ad hoc interventions in the regulatory system. If necessary, complement law 28832 with necessary new or adjusted norms
- Continue implementing temporary transmission programs designed by MINEM, through the intervention of ProInversión, until the transmission system planning mechanism established in the new sector law is fully operational
- Sustain budget resources sufficient enough to reach the government’s objective of 80 percent of rural coverage for electricity services by 2015
- As in other countries, an Independent Market Monitoring group should follow electricity market behavior and make recommendations

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This Peru – REDI report has been reviewing the three infrastructure sectors through a comprehensive and strategic approach. The proposed recommendations have been selected with a view to maximize the impact of the on-going stimulus package, but also to prepare the ground for the post-stimulus phase. Sustaining sufficient levels of investment in infrastructure (at least 2 percent of GDP) over the coming decade - and not only during the two years of the stimulus package, will be essential if Peru wants to bridge its infrastructure gap with competitors in the region. However, more attention will also have to be paid to the following four policy areas that are directly linked to the quality and effectiveness of expenditures in the infrastructure sectors: (i) planning of investments; (ii) efficiency of service provision; (iii) decentralization; and (iv) private sector participation.

It should be acknowledged that it is very difficult to tackle a large number of reforms all at once. In addition, the various investment measures listed above present different levels of technical or political difficulty. Yet, there is no silver bullet and only a combination of multiple policy actions will be able to achieve the desired results in terms of economic growth and poverty reduction. A phased approach is therefore needed, starting with the easiest and readily implementable actions (“low hanging fruits”) while more complex, high impact reforms can be designed and prepared. For each of the four policy areas, the table below identifies two priority reforms that are ready to be implemented in the short term, as well as two more challenging but essential measures that should be implementable in the medium term, provided that the corresponding preparatory activities (eg. feasibility studies and evaluation of design alternatives) be quickly initiated. While the comprehensive reform program described above needs to be fully

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implemented in order to achieve the greatest results, the following core program for cross-sector infrastructure reforms could still produce radical improvements in terms of the efficiency and the effectiveness of infrastructure investments in Peru.

### Core program for cross-sector infrastructure reforms

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<tr>
<th>Planning investments</th>
<th>Easiest and readily implementable actions</th>
<th>More complex, high impact reforms</th>
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<tbody>
<tr>
<td></td>
<td>• Create a Logistics Council under the National Competitiveness Council</td>
<td>• Design and implement a new paradigm for trade logistics policy, integrating relevant policy areas that currently show poor coordination</td>
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<td>• Finalize the updating of the Intermodal Plan</td>
<td>• Modernize planning agencies and build up their technical competence, with the objective of moving from investment programming to investment planning</td>
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<td>Efficiency of service provision</td>
<td>• Fully scale up innovative and efficient models for operation and maintenance</td>
<td>• Better align technical standards with the expected benefits of infrastructure investments</td>
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<td>• Fully implement the Anticorruption Action Plan</td>
<td>• Consider increasing tariffs for infrastructure services other than electricity and communicate about the rationale for such an increase</td>
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<td>Decentralization</td>
<td>• Design a program supporting the preparation of high quality pre-investment studies for infrastructure investments at the subnational level whose implementation could be financed from a variety of financing sources</td>
<td>• Pilot a territorial development approach, based on the successful experience of Chile, after having identified the right champion to lead that agenda in Peru or through working with individual regions</td>
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<td>• Cautiously explore developing subnational borrowing, starting with the six Peruvian regions that could best benefit from such a possibility</td>
<td>• Revise the functioning of FONIPREL with greater consideration of the relative performance of regions</td>
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<td>Private sector participation</td>
<td>• Promote greater coordination among public actors involved in PPPs, for example through establishing “virtual” task forces for specific PPP transactions</td>
<td>• Promote the preparation of a pipeline of robust and well-designed projects with credible feasibility studies that can pass the SNIP process</td>
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<td>• Fully implement the methodology to assess contingent liabilities, including from non-financial guarantees</td>
<td>• Strengthen the institutional capacity of regulators so that they can better guide the design of PPP transactions and better ensure that contractual obligations are actually implemented</td>
</tr>
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</table>
REFERENCES


PROINVERSIÓN. 2009. Schedule of infrastructure projects to concession. Available at:


