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**Estimating Demand for  
Infrastructure in Energy, Transport,  
Telecommunications, Water and  
Sanitation in Asia and the Pacific:  
2010-2020**

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**Abstract\***

Infrastructure plays a key role in promoting and sustaining rapid economic growth. Properly designed infrastructure can also make growth more inclusive by sharing its benefits with poorer groups and communities, especially by connecting remote areas and small and landlocked countries to major business centers. Even if the Asia-Pacific region has witnessed progress in infrastructure development, the growth of infrastructure lags behind its economic growth, and also behind international standards of infrastructure quantity and quality. Inadequate infrastructure can hamper the potential economic growth of Asian countries, weaken their international competitiveness, and adversely affect their poverty reduction efforts. The circumstances and effects of the recent economic and financial crisis provide a number of reasons to further develop national and regional infrastructure in Asia. Among these reasons is that regional infrastructure enhances competitiveness and productivity, which could help in economic recovery and in sustaining growth in the medium to long-term. Regional infrastructure also helps increase standard of living and reduce poverty by connecting isolated places and people with major economic centers and markets, narrowing the development gap among Asian economies. This paper estimates the need for infrastructure investment, including energy, transport, telecommunications, water, and sanitation during 2010-2020, in order to meet growing demands for services and facilitate further rapid growth in the region. By using “top-down” and “bottom-up” approaches, this paper provides a comprehensive estimate of Asia’s need for infrastructure services. The estimates show that developing countries in Asia require financing of US\$776 billion per year for national (US\$747 billion) and regional (US\$29 billion) infrastructure during 2010-2020 to meet growing demand.

**JEL Classification: L9, O1, O2, R11, R4**

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## 1. INTRODUCTION

Infrastructure plays a key role in promoting and sustaining rapid economic growth. Properly designed infrastructure can also make growth more inclusive by sharing its benefits with poorer groups and communities, especially by connecting remote areas and small and landlocked countries to major business centers. Studies in several developing Asian countries illustrate how infrastructure, particularly road transport and electricity, help in reducing poverty (ADB, JBIC, and World Bank 2005). Even if the Asia-Pacific region has witnessed progress in infrastructure development, the growth of infrastructure lags behind its economic growth, and also behind international standards of infrastructure quantity and quality. Inadequate infrastructure can hamper the potential economic growth of Asian countries, weaken their international competitiveness, and adversely affect their poverty reduction efforts. Moreover, it is noteworthy to stress that the Asia-Pacific region accounts for about 60% of the world's population and 30% of the world's total land area, with nearly two-thirds of the world's poor found in developing Asia (ADB 2007).

Interestingly, 10 out of 12 economies globally with GDP growth rates of 7% or more over the past 25 years are in Asia<sup>1</sup> (Commission on Growth and Development 2008). During this period of rapid economic growth, Asia has increasingly integrated into the global economy. It has become the world's factory by pursuing outward-oriented development strategies, establishing global production networks and supply chains, and building needed infrastructure. Asian regional economies have succeeded and benefited from regionally producing and trading intermediate goods, then exporting final goods to the West.

However, the recent global crisis has reduced Asia's external demand, industrial production, investment and employment, adversely affecting consumer spending. The prospect of a prolonged downturn in major advanced markets as a result of crisis underscores the urgent need for rebalancing Asia's growth and increasing investments in highly productive sectors, such as infrastructure, to facilitate greater domestic and regional demand. Infrastructure investment in particular has also played a major role in fiscal stimulus packages used by Asian economies to mitigate the negative effects of the global crisis. These infrastructure investments have been utilized in key sectors, such as transportation; energy; information technology and communications (ITC); and water and sanitation, in both rural and urban projects (Table 1).

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<sup>1</sup> Including Bangladesh, People's Republic of China (PRC), Thailand, Indonesia, Japan, Republic of Korea (Korea), Malaysia, Singapore, Taipei, China, and Hong Kong, China.

**Table 1: Infrastructure Investment in the Stimulus Packages of the Major Asian Economies (US\$ billion)**

Country	Total Fiscal Stimulus	Infrastructure Component	Infrastructure as % of Total Stimulus	Types of Infrastructure
PRC	600.0	275.0	45.80%	Railways, airports, electrical transmission technology, expressways, telecommunications technologies, rural roads, electricity, gas, water, and irrigation projects
India	60.0	33.5	55.80%	Highway, port, and power sectors
Indonesia	7.7	1.3	16.90%	Communications and transport infrastructure, rural infrastructure, and development of ports and shipping industry
Viet Nam	8.0	4.8	60.00%	Infrastructure spending
Thailand	46.7	30.6	65.50%	Water resource development and road construction in villages and rural areas along with transport, logistics, energy, and telecom improvements
Malaysia	2.0	0.2	8.50%	Low and medium cost housing, upgrade, repair, and maintain police stations and army camps, and public and basic infrastructure project maintenance
Korea	11.0	3.2	29%	Roads, universities, schools, hospitals
Japan	154.55	16	10%+	Yen 1.6 trillion for fostering environmentally friendly technologies, including plans to provide cheaper solar power to homes and up to \$2,500 as tax breaks to consumers on purchases of "green" cars; subsidies of 5% on energy efficient televisions and other appliances

Sources: Author's estimations from data in: Kang (2010); Sugimoto (2010); Kumar and Soumya (2010); Patunru and Zetha (2010); Nguyen, Nguyen, and Nguyen (2010); Jitsuchon (2010); World Bank (2009b); FAITC (2009); Alibaba.com (2008); IFCE (2009); Economy Watch (2010); (Tabuchi 2009) and ADB (2009a). <http://www.economywatch.com/economic-stimulus/world-economic-stimulus/south-korea.html><http://www.nytimes.com/2009/04/09/business/global/09yen.html>

The circumstances and effects of the recent economic and financial crisis provide a number of reasons to further develop national and regional infrastructure (see Box 1 for definition) in Asia. Among these reasons is that regional infrastructure enhances competitiveness and productivity, which could help in economic recovery and in sustaining growth in the medium to long-term. Regional infrastructure also helps increase standard of living and reduce poverty by connecting isolated places and people with major economic centers and markets, narrowing the development gap among Asian economies. It also promotes environmental sustainability, facilitates regional trade integration and the acceleration of regional cooperation, and helps increase regional demand and intraregional trade necessary to rebalance Asia's economic growth.

### Box 1: Defining Regional Infrastructure

“A regional (cross-border or transnational) infrastructure project is defined as a project with activities such as physical construction works and coordinated actions related to policies and procedures, spanning over two or more countries, or a national infrastructure project that has significant cross-border impact. A national infrastructure project has significant cross-border impact if it satisfies one or more of the following criteria: (i) The planning and implementation of a project that involves cooperation and coordination between two or more countries; (ii) As per the pre-determined plan, a project that produces significant sales of goods or services across regional borders, where significant means at least twenty-percent or more of the total sales; (iii) A project that involves the construction of specific infrastructure, such as a road, a bridge, or a tunnel located on or largely on the territory of a country near the border and is necessary to link the country to the network of a neighboring country or a third country” (Bhattacharyay 2008).

Despite relatively good growth in infrastructure investment and development during the last few decades, the region still faces extensive basic infrastructure needs. For instance, 1.5 billion people in Asia and the Pacific have no access to improved sanitation, 638 million have no access to improved drinking water, and 930 million have no access to electricity services (IMF 2006). Only 3 out of every 10 people have access to telephone services and only 53.4% of the total road network in Asia of 5.66 million km is paved (ADB 2007). Moreover, the cost of maintaining existing infrastructure continues to rise. Fast growing economies like PRC, India, Thailand, Indonesia, the Philippines, and Viet Nam are seeing their countries’ aging infrastructure and limited capacities being stretched and coming under extreme pressure. Therefore, in spite of the large infrastructure investment under the aforementioned stimulus packages, the financing needs for national and regional projects are huge.

It is very important to assess the magnitude of national infrastructure financing needs and financing gaps of Asian economies by key sectors such as transport, energy, telecommunications, water and sanitation as well as the regional infrastructure financing needs for identified regional projects.

This paper attempts to estimate national infrastructure financing needs for 32 Asian developing economies during 2010-2020 using a “top down” econometric approach based on the projected growth of key economic parameters such as GDP and population. The selected countries by sub region are as follows:

- Central Asia – Afghanistan, Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, and Uzbekistan;
- Southeast Asia - Cambodia, Indonesia, Philippines, Malaysia, Myanmar, Viet Nam, Lao PDR, and Thailand;
- East Asia and the Pacific - PRC, Mongolia, Fiji, Kiribati, Marshall Islands, Papua New Guinea (PNG), Samoa, Solomon Islands, Tonga, and Vanuatu; and
- South Asia - Bangladesh, Bhutan, India, Nepal, and Sri Lanka.

The paper also estimates, for the first time, the financing needs for regional infrastructure projects using a “bottom-up” approach based on identified pipeline regional infrastructure projects across Asia. Section 2 discusses the concept of pan-Asia infrastructure connectivity and its relationship with quality of infrastructure and global competitiveness. The next section presents the methodologies used for estimating financing needs for national and regional infrastructure projects. Section 4 presents the financing needs of national infrastructure of 32 Asian economies by sector. The financing needs for regional infrastructure by sector and sub region are presented in Section 5. Section 6 concludes with an examination of the broad challenges for infrastructure financing in Asia.

## 2. INFRASTRUCTURE CONNECTIVITY AND COMPETITIVENESS

Developing infrastructure networks and connectivity are essential to integrating core and wider economic activities and basic services in the region. The latest World Economic Forum (2010) Global Competitiveness Report, and the Infrastructure Quality assessment included within, illustrates the importance of infrastructure quality in global competitiveness (Table 2). Moreover, various studies have also shown that the quality and extensiveness of infrastructure networks greatly impact economic growth and reduce income inequalities and poverty (ADB/ADBI 2009).

**Table 2: Ranking and Score of Global Competitiveness Index and Infrastructure Quality Assessment of Selected Countries in Asia**

Economy	2009/2010			
	GCI		Infrastructure	
	Rank	Score	Rank	Score
<b>Developed and Newly Industrialized Asia (Average)</b>		<b>5.25</b>		<b>5.85</b>
Australia	15	5.15	25	5.19
Hong Kong, China	11	5.22	2	6.54
Japan	8	5.37	13	5.83
Korea	19	5.00	17	5.60
Singapore	3	5.55	4	6.35
Taipei, China	12	5.20	16	5.60
<b>Developing and Emerging Asia (Average)</b>		<b>4.10</b>		<b>3.44</b>
Bangladesh	106	3.55	126	2.39
India	49	4.30	76	3.41
Indonesia	54	4.26	84	3.20
Malaysia	24	4.87	26	5.05
Nepal	125	3.34	131	2.03
Pakistan	101	3.58	89	3.06
Philippines	87	3.90	98	2.91
PRC	29	4.74	46	4.31
Sri Lanka	79	4.01	64	3.88
Thailand	36	4.56	40	4.57
Viet Nam	75	4.03	94	3.00

Note: Ranking out of 133 total countries surveyed

Score: 1-poorly developed, inefficient; 7-among the best in the world

Source: World Economic Forum (2010)

To date, connectivity has improved across most parts of the Asia-Pacific region, but much still needs to be done. In particular, as shown in Table 3, enhancing transportation and energy infrastructure in developing countries remains a challenge. Asian economies exhibit a wide variation in road and rail densities as well as in rates of electrification. Even though marked improvements in road and electrification have been seen over the last two decades, there is still a long way to go before basic infrastructure needs are fulfilled.



**Table 3: Regional Transport Infrastructure**

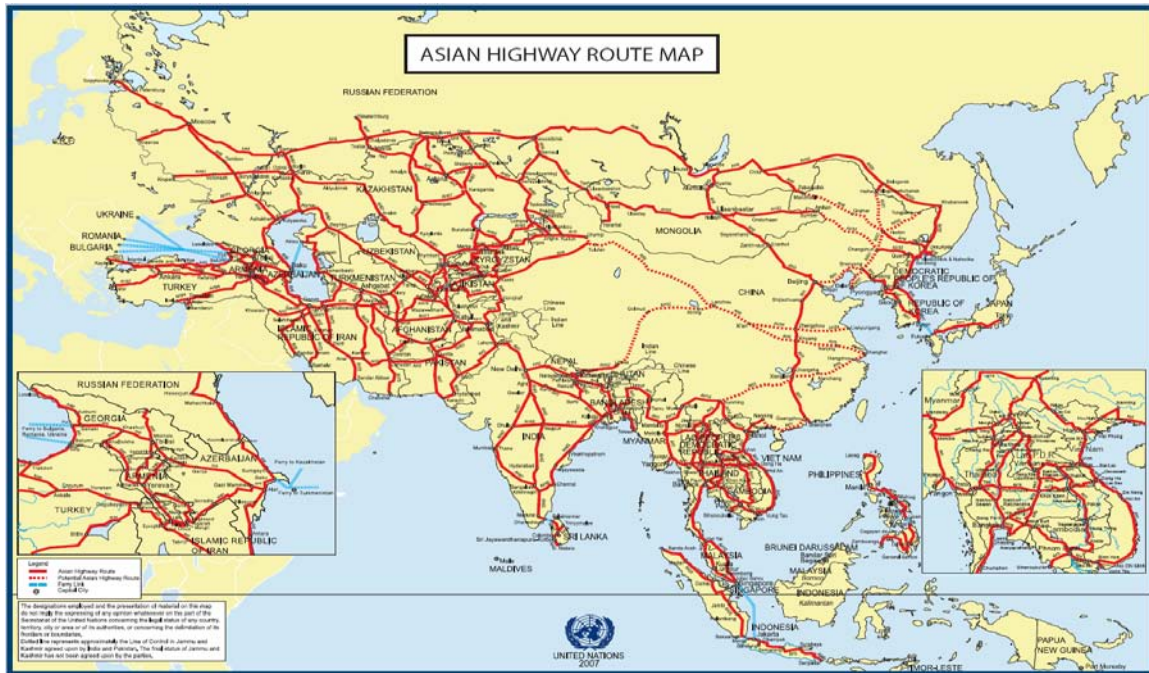
	Road Density			Rail Network Density			Household Electrification Rates			
	(km/1000 sq km land)			(km/1000 sq km land)			(% of Households)			
	1990	Latest Year		1990	Latest Year		Earliest Year		Latest Year	
<b>Central Asia</b>										
Afghanistan	32	65	(2006)	...	...	(2007)	...	...	25	(1995)
Armenia	273	266	(2006)	30	25	(2005)	99	(2000)	100	(2005)
Azerbaijan	630	715	(2004)	...	26	(2006)	97	(1999)	100	(2006)
Georgia	311	293	(2006)	23	22	(2007)	...	...	100	(2002)
Kazakhstan	59	34	(2006)	5	5	(2007)	...	...	...	...
Kyrgyz Rep.	99	97	(2001)	...	...	...	100	(1997)	100	(2002)
Pakistan	220	338	(2006)	11	10	(2007)	60	(1990)	89	(2006)
Tajikistan	213	198	(2001)	...	...	...	97	(1999)	99	(2003)
Uzbekistan	170	192	(2001)	...	9	(2007)	100	(1996)	100	(2002)
<b>East and Southeast Asia</b>										
Cambodia	203	217	(2004)	3	4	(2005)	17	(2000)	21	(2005)
PRC	127	371	(2006)	6	7	(2007)	...	...	...	...
Indonesia	159	216	(2005)	...	3	(1998)	49	(1991)	91	(2007)
Lao PDR	61	129	(2006)	...	...	...	...	...	46	(2002)
Malaysia	262	283	(2005)	5	5	(2007)	...	...	...	...
Mongolia	27	31	(2002)	1	1	(2007)	67	(2000)	86	(2005)
Myanmar	38	41	(2005)	5	...	...	...	...	47	(2002)
Philippines	539	671	(2003)	2	2	(2006)	65	(1993)	77	(2003)
Thailand	141	352	(2006)	8	8	(2006)	...	...	99	(2005)
Viet Nam	295	717	(2004)	9	10	(2007)	78	(1997)	96	(2005)
<b>South Asia</b>										
Bangladesh	1444	1838	(2003)	21	22	(2007)	18	(2000)	47	(2007)
Bhutan	50	171	(2003)	...	...	...	...	...	41	(2003)
India	673	1116	(2006)	21	21	(2007)	51	(1991)	68	(2005)
Nepal	48	121	(2004)	...	...	...	18	(1996)	61	(2006)
Sri Lanka	1439	1505	(2003)	23	19	(2005)	...	...	81	(2002)
<b>The Pacific</b>										
Fiji	167	188	(2001)	...	...	...	...	...	67	(1996)
Kiribati	...	827	(2000)	...	...	...	...	...	39	(2005)
PNG	41	43	(2001)	...	...	...	...	...	11	(1996)
Samoa	...	826	(2001)	...	...	...	79	(1991)	92	(2006)
Solomon Is.	43	50	(2001)	...	...	...	...	...	16	(1999)
Timor-Leste	...	...	...	...	...	...	...	...	27	(2002)
Tonga	...	944	(2001)	...	...	...	80	(1994)	89	(2006)
Vanuatu	...	88	(2001)	...	...	...	18	(1994)	19	(1999)

Source: ADB (2009b)

The concept of connectivity through the development of regional infrastructure projects or infrastructure that links one country to another is not really new to Asia. History shows that transport connectivity in Asia started with the Silk Road in the 13<sup>th</sup> Century. The Silk Road used to be the most important cross-border artery and the was an extensive, interconnected network of pan-Asian trade routes linking East, South, Central, and Western Asia. In 1992, the concept of pan-Asia transport connectivity was revived by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). The Asian Land Transport Infrastructure Development (ALTID) initiative is comprised of three pillars, the Asian Highway (AH), the Trans-Asian Railway (TAR), and the facilitation of land transport projects through intermodal transport terminals (UNESCAP 2010a).

AH (Figure 1) seeks to improve economic links among Asia, Europe, and the Middle East. It is planned as a network of 141,271 km of standardized highways—including 155 cross-border roads—that crisscrosses 32 Asian countries.

**Figure 1: Asian Highway Network**



Source: UNESCAP (2010b)

The TAR network (Figure 2) would link pan-Asian and pan-European rail networks at various locations, connecting major ports of Asia and Europe and providing landlocked countries with better access to seaports either directly or in conjunction with highways.

**Figure 2: Trans-Asian Railway Network**



Source: UNESCAP (2010c)

Regional infrastructure projects are usually more complicated and expensive than typical national infrastructure projects. In this context, it is also a complex, yet necessary, exercise to estimate the financing demand for regional projects and national projects with regional implications. It is hoped in this paper that by providing estimates of the needed regional infrastructure financing, it will help to clearly define the issues and challenges at hand and facilitate the planning and development of solutions for identifying appropriate investment strategies and financial resources, as well prioritizing projects for utilization of limited resources.

### 3. METHODOLOGY FOR ESTIMATION

This section presents methodologies for both “top-down” and “bottom-up” approaches to estimating or determining national and regional infrastructure investment needs respectively for the Asia-Pacific region. While the “top-down” approach utilizes econometric analysis techniques to quantitatively estimate national infrastructure needs and, by extension, regional needs, the “bottom-up” approach reviews infrastructure investment demand at the project level specifically for regional or cross-boarder projects.

#### 3.1 “Top-down” Approach: Infrastructure Needs at the National Level <sup>2</sup>

A “top-down” econometric approach has been used to estimate national infrastructure financing needs. A two-step procedure was utilized to develop the forecast. The first step involved creating an econometric model that could be used across countries to project physical capacity needs per sector for each year during the period 2010-2020. Reliability of the model was tested by inputting available historic data through 2007. In the second step, after the projections of the physical capacities were derived, standard unit costs (in 2008 US\$) based on international “best practice” norms were applied to estimate the investment requirements for new capacity. Finally, the report projected the investments required to maintain or replace the existing capacity at the end of its useful life. The national infrastructure estimates were based on the best available GDP growth scenarios. The cumulative financing demand for national infrastructure projects were used as an estimate for the region. The projections covered transport (airports, ports, railways, and roads), telecommunications (landlines and mobile phones), energy (power), and water and sanitation for the 32 developing countries in Asia included in this examination.

The econometric model developed by Fay (2001) was utilized to project the estimated change in demand for infrastructure services in the period 2010 to 2020. The model estimates future demand for infrastructure, where infrastructure services are both demanded as consumption goods by individuals and as inputs into the production process by companies. The model applied in this estimation also drew upon the works of Chatterton and Puerto (2005) and Yepes (2004) to ensure forecasting accuracy. The baseline econometric model is as follows:

$$I_{it}^j = \alpha_1 I_{it-1}^j + \alpha_2 Y_{it} + \alpha_3 A_{it} + \alpha_4 M_{it} + \alpha_5 U_{it} + \alpha_6 P_{it} + \alpha_7 t + D_j + \varepsilon_{it}$$

where,

$I_{it}^j$  is the natural logarithm of demand for infrastructure stock of type  $j$  in country  $i$  at time  $t$ ,

$Y$  is the natural logarithm of income per capita,

$A$  is the natural logarithm of the share of agriculture value added in GDP,

$M$  is the natural logarithm of the share of manufacturing value added in GDP,

$U$  is the natural logarithm of urbanization,

<sup>2</sup> Based on ADBI commissioned report by Centennial Group Holdings (2009).

$P$  is the natural logarithm of population density, and  
 $D_j$  is a country fixed effect, and  
 $\varepsilon_{it}$  is the error term.

The given equation can be interpreted as a law of motion for infrastructure stock. The data was organized as an unbalanced panel with yearly observations for the period 1960 to 2005 from a number of databases, including from the World Bank, the Energy Information Administration, the Millennium Development Goals Indicators, and the United Nations Statistics Division.

Projections for the independent variables were used to estimate the values of the infrastructure variables in the period 2009-2020. These variables included land area, population, urbanization, share of agriculture value-added in GDP, share of manufacturing value-added in GDP, and GDP annual growth. Land area is assumed to be constant and equal to 2005 figures in each country. The sources of projections for population and GDP growth include the World Bank, ADB, and the International Monetary Fund (IMF). The growth rates projected by IMF's World Economic Outlook (WEO) for 2008-2013 were used as the base case (IMF 2006). A cap of 900 mobile phones and 400 fixed lines per 1000 people was imposed for the telecommunication services. For the replacement costs, power, roads, rail, airports, ports were assumed to be 2% of the stock value, while water and telecoms replacement costs were assumed to 3% and 8% of the stock value, respectively. Fixed linear regressions employing time and its square (as necessary) as explanatory variables were used, using historic trends to predict each variable.

### 3.2 “Bottom-up” Approach: Regional Financing Needs Estimation

The estimation of future regional infrastructure demand is likewise very complicated and no well-accepted econometric method is available. The actual realization of a regional project depends on many economic and non-economic factors. Therefore, a “bottom-up” methodology was used in this stage. The “bottom-up” methodology is a conservative approach that identifies individual infrastructure projects and estimate costs of their implementation. The compiled project information is then used to obtain the total infrastructure service demand by region, by sub-regional program, and by sector.

This section gives an overview of the financing need per type of project by region. It tries to avoid usual assumptions to project demand and instead identifies economically viable projects, estimates the costs of their implementation, and combines all relevant infrastructure projects (e.g., energy; transport; telecommunications; ICT; and logistics and trade facilitation) that have already been entered into the planning stages throughout Asia. The study utilized varied sources, including multilateral and bilateral development institutions. In a few exceptional cases, the cost investment figures came from non-traditional sources like media reports.

The investment estimations account for regional differences as well as priority investments in planned infrastructure projects, and breaks down demand into the following groups and programs<sup>3</sup>:

- (i) Pan-Asian, such as the ALTID project;
- (ii) Sub-regional, including the Greater Mekong Sub-region (GMS), the Central Asia Regional Economic Council (CAREC), the South Asia Sub-regional Economic Council (SASEC), and the Pacific Countries; and
- (iii) Other sub-regional and cross-sub regional programs, such as within and between South Asia, Central Asia, Central-South Asia, East Asia-Southeast Asia, and the Association for Southeast Asian Nations (ASEAN).

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<sup>3</sup> The lists of countries included in all of the groupings and programs can be found in Appendix 1 of this paper.

The limitations of this approach include not taking into account the regional infrastructure projects that are national projects with significant cross-border impact such as airports, seaports, roads connecting to borders, airports and seaports, and power generation projects supplying power to neighboring countries. In addition, data on projects identified or planned may not be available or may be confidential. Furthermore, large economies (such as PRC and India) may have some sizable regional transport and energy projects with their neighbors under their national plans that are not covered under pan-Asia and sub-regional plans and programs. Finally, issues may arise as a result of inaccurate cost estimates and failure to actually initiate or implement of some of the projects due to unforeseen reasons and non-economic factors in the future.

As the estimation of national infrastructure financing needs is based on “top-down” econometric method, it is not possible to identify specific national projects that are regional in nature. However, the econometric estimation of national airports and seaports can be used as regional infrastructure financing needs.

### **3.3 Scenario-Building: Demand for Regional Infrastructure**

The mixture of “top-bottom” and “bottom-up” approaches simply means that the source of information came from both the estimation of national infrastructure needs based on macroeconomic and growth factors and the utilization of data provided by organizations and countries involved in the implementation of the regional projects. Given the goal of estimating regional demand, only infrastructure projects involving coordination between two or more countries were included in the “bottom-up” approach. The calculation provides an estimation on the cost per project and per sector, and then of the cumulative cost at the national, sub-regional, and regional levels. The annual average costs per year are derived from the estimated total cost for the period.

To provide the most realistic picture of Asia’s investment requirements in the “top-down” approach, three sets of estimates were created. Scenarios including a “low-case”, a “base-case”, and a “high-case” were derived from econometric models in which adjustments were made to accommodate possible slower and faster than projected GDP growth and/or managerial constraints. It is important to note though that these projections are estimates of investments required to meet the needs of the countries. Estimates are based on a replacement cost factor of 2% of existing infrastructure stock in most sectors and as such could be very conservative. Actual unit costs would typically vary by country according to domestic conditions and both new investment and replacement costs may turn out to be higher than international best practice norms used to arrive at the estimations. Moreover, the “top-down”, order-of-magnitude estimates must be regarded as a reference point rather than a substitute for more precise, “bottom-up”, country and sector specific estimates. For the remainder of this paper, all data references and tables pertaining to the “top-down” estimations show the most conservative, “low-case” scenario results.

## **4. NATIONAL FINANCING NEEDS FOR CONNECTIVITY: 2010-2020**

During the ten-year period of 2010-2020, the 32 ADB developing member countries covered in this paper are expected to need almost US\$8.22 trillion (in 2008 US\$) for infrastructure investment. This amounts to US\$747 billion in annual investment needed over 2010-2020. Around 68% of this is needed for new capacity investments in infrastructure and around 32% is needed for maintenance or replacement of existing assets. In general, the total projected infrastructure investment requirements are equal to about 6.5% of Asian estimated 2010-2020 GDP. Of the total investment, approximately 49% is estimated to be needed for energy infrastructure, 35% for transport, 13% for ITC, and 3% for water and sanitation. Among the

countries included in the study, PRC, India, and Indonesia represent the top three countries in terms of amount of infrastructure investment needed. Overall, the top 11 countries constitute 97% of Asia's total infrastructure investment needs, most of which are in Southeast Asia and South Asia (Table 4).

**Table 4: National Infrastructure Investment Needs in Asia: 2010-2020**

Country / Sub region	% of Total Asian Investment Need	Estimated Investment Needs (US\$ millions)	Investments as Percentage of Total		Total Investment per Year	Total Investment per Capita (US\$)	2008 GDP Per Capita (Constant 2000 US\$)
			New Capacity	Maintenance			
<b>Central Asia</b>	<b>4.544%</b>	<b>373,657</b>	<b>54%</b>	<b>46%</b>	<b>33,969</b>	<b>1,403</b>	<b>753</b>
Afghanistan	0.318%	26,142	57%	43%	2,377	901	-
Armenia	0.051%	4,179	41%	59%	380	1,358	1,520
Azerbaijan	0.344%	28,317	64%	36%	2,574	3,262	2,131
Georgia	0.060%	4,901	24%	76%	446	1,138	1,268
Kazakhstan	0.846%	69,538	61%	39%	6,322	4,436	2,378
Kyrgyz Rep.	0.107%	8,789	38%	62%	799	1,665	376
Pakistan	2.172%	178,558	53%	47%	16,233	1,075	650
Tajikistan	0.139%	11,468	47%	53%	1,043	1,678	245
Uzbekistan	0.508%	41,764	48%	52%	3,797	1,529	840
<b>East and Southeast Asia</b>	<b>66.553%</b>	<b>5,472,327</b>	<b>71%</b>	<b>29%</b>	<b>497,484</b>	<b>2,886</b>	<b>1,765</b>
Cambodia	0.163%	13,364	51%	49%	1,215	918	511
PRC	53.118%	4,367,642	72%	28%	397,058	3,297	1,965
Indonesia	5.476%	450,304	70%	30%	40,937	1,981	1,087
Lao PDR	0.138%	11,375	56%	44%	1,034	1,833	475
Malaysia	2.287%	188,084	79%	21%	17,099	6,962	5,151
Mongolia	0.122%	10,069	37%	63%	915	3,812	735
Myanmar	0.264%	21,698	56%	44%	1,973	438	-
Philippines	1.546%	127,122	53%	47%	11,557	1,407	1,225
Thailand	2.103%	172,907	72%	28%	15,719	2,566	2,640
Viet Nam	1.335%	109,761	53%	47%	9,978	1,273	647
<b>South Asia</b>	<b>28.829%</b>	<b>2,370,497</b>	<b>63%</b>	<b>37%</b>	<b>215,500</b>	<b>1,756</b>	<b>685</b>
Bangladesh	1.762%	144,903	54%	46%	13,173	906	462
Bhutan	0.011%	886	30%	70%	81	1,291	1,247
India	26.421%	2,172,469	64%	36%	197,497	1,906	718
Nepal	0.174%	14,330	50%	50%	1,303	497	254
Sri Lanka	0.461%	37,908	52%	48%	3,446	1,881	1,199
<b>The Pacific</b>	<b>0.073%</b>	<b>6,023</b>	<b>30%</b>	<b>70%</b>	<b>548</b>	<b>625</b>	<b>840</b>
Fiji	0.008%	667	15%	85%	61	790	2,181
Kiribati	0.001%	82	10%	90%	7	846	826
PNG	0.051%	4,214	34%	66%	383	641	676
Samoa	0.003%	242	13%	87%	22	1,351	1,739
Solomon Is.	0.004%	336	33%	67%	31	657	1,136
Timor-Leste	0.001%	71	35%	65%	6	65	329
Tonga	0.001%	106	13%	87%	10	1,022	1,666
Vanuatu	0.004%	306	40%	60%	28	1,309	1,339
<b>Total Asia</b>	<b>100%</b>	<b>8,222,503</b>	<b>68%</b>	<b>32%</b>	<b>747,500</b>	<b>2,335</b>	<b>1,272</b>

Note: Estimates obtained using the low case scenario.

Source: Author, ADB/ADBI (2009), Centennial (2009)

The estimation results in this study are comparable with similar, country-level projections undertaken in other available studies focusing on a similar time frame, including Goldman Sachs Global Economics Papers by Lawson and Dragusanu (2008) and Poddar (2009) for the BRICS<sup>4</sup> countries. A similar model was applied in these studies and the comparative results support the estimations in this paper for PRC and India, as well as the other Asian economies covered in this study. For example, the revised Poddar (2009) estimates for India's total infrastructure investment requirements for 2010-2020—after adjusting for differences in sector coverage and scope (new capacity or maintenance)—is 18% higher than the estimates provided in this study, and older estimates by Lawson and Dragusanu (2008) for PRC over a slightly different time frame (2008-2018) are only 20% lower. The estimates between this study and the Goldman Sachs studies are also comparable by sector.

The estimates of total national infrastructure needs for 2010-2020 in this paper increased slightly, by US\$230.8 billion, compared to those presented previously in ADB/ADBI (2009). Total infrastructure investment needs here include estimates for Myanmar, Afghanistan, and the Solomon Islands, which were excluded in ADB/ADBI (2009). Additionally, some country estimates were revised upward to take account of updated data and economic projections.

Table 5 shows the breakdown of investment needs by sector among the four sub-regional groupings and Figure 3 presents national investment needs by sector for the top 11 economies. Generally, energy and transportation make up the largest components of total Asia infrastructure investment needs. By sub-region, the biggest investment needs are in East and Southeast Asia at US\$5.47 trillion, or 67% of the total, and South Asia at US\$2.37 trillion, or 29% of the total. Not surprisingly, the biggest economies in Asia—PRC and India—are located in these sub-regions.

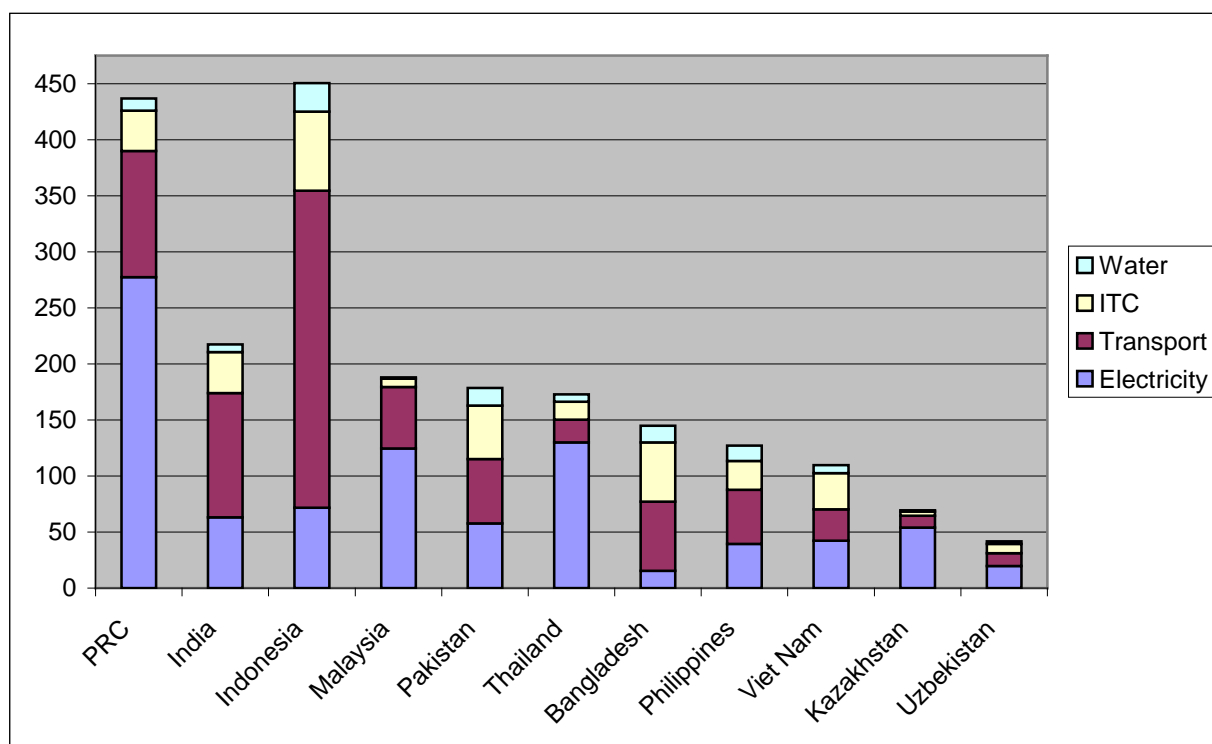
**Table 5: National Infrastructure Investment Needs in Asia, 2010-2020: Per Sub-region and Per Sector (2008 US\$ billions)**

Sector / Subsector	East and Southeast Asia	South Asia	Central Asia	The Pacific	Total
<b>Electricity</b>	3,182.46	653.67	167.16	-	4,003.29
<b>Transportation</b>	1,593.87	1,196.12	104.48	4.41	2,898.87
Airports	57.73	5.07	1.41	0.10	64.31
Ports	215.20	36.08	5.38	-	256.65
Rails	16.14	12.78	6.03	0.00	34.95
Roads	1,304.80	1,142.20	91.65	4.31	2,542.97
<b>Telecommunications</b>	524.75	435.62	78.62	1.11	1,040.10
Telephones	142.91	6.46	4.45	0.05	153.87
Mobiles	339.05	415.87	71.97	0.95	827.84
Broadband	42.78	13.29	2.21	0.11	58.39
<b>Water and Sanitation</b>	171.25	85.09	23.40	0.51	280.24
Water	58.37	46.12	8.60	0.14	113.22
Sanitation	112.88	38.97	14.80	0.36	167.02
<b>Total</b>	5,472.33	2,370.50	373.66	6.02	8,222.50

Source: Author, ADB/ADBI (2009), Centennial (2009)

<sup>4</sup> BRICS = Brazil, Russia, India, China, South Africa

**Figure 3: National Infrastructure Investment Needs in Asia, 2010-2020: Top 11 Countries by Sector (2008 US\$ Billion – PRC and India in 10 Billion)**



Source: Author, ADB/ADBI (2009), Centennial (2009)

According to the estimates of this study, Central Asia is expected to need a total of US\$374 billion in infrastructure investment over the next 10 years. Energy (electricity) infrastructure comprises 45% of the amount, followed by the transport sector which needs 28% primarily for investment in roads. Considering the geographic nature of Central Asian nations, these results are understandable. In the South Asian sub-region, the transport sector is facing the largest estimated investment requirement of US\$1.2 trillion. Considering that many of the countries are landlocked, similar to Central Asian countries, the majority of this amount is also for road infrastructure. East Asia and Southeast Asia are grouped here and include countries in ASEAN as well as GMS. In this sub-region, nearly 60% of the investment needs are in the power sector. This is followed by the transport sector, the telecommunications sector, and then the water and sanitation sector. The Pacific sub-region needs an estimated US\$6 billion in infrastructure investment, representing 3.6% of the sub-region’s cumulative projected 2010-2020 GDP. A large percentage of this need is in transport infrastructure, specifically road and airport projects.

Looking at national infrastructure investment needs in relation to projected GDP further shows how great the demand is. As can be seen in Table 6, needed investments in transport, electricity, ITC, and water amount to more than 6.5% of Asia’s estimated 2010-2020 GDP. Electricity in particular represents the largest share, at 3.2% of Asian GDP, and South Asia (excluding Afghanistan and Pakistan, which are included in central Asia) will need to invest approximately 11% of GDP in order to meet rising demands for infrastructure services.



**Table 6: Infrastructure Investment Needs as a % of Estimated GDP 2010-2020**

Country	Investment as % of Estimated GDP				
	Transport	Electricity	ITC	Water and Sanitation	Total
<b>Central Asia</b>	<b>1.86%</b>	<b>2.97%</b>	<b>1.40%</b>	<b>0.42%</b>	<b>6.64%</b>
Afghanistan	6.21%	0.00%	4.82%	0.89%	11.92%
Armenia	1.20%	1.01%	0.98%	0.27%	3.46%
Azerbaijan	0.60%	3.82%	0.44%	0.11%	4.97%
Georgia	1.20%	1.06%	0.69%	0.19%	3.14%
Kazakhstan	0.58%	2.92%	0.20%	0.07%	3.77%
Kyrgyz Rep.	3.94%	6.24%	2.44%	0.67%	13.29%
Pakistan	2.65%	2.68%	2.22%	0.73%	8.27%
Tajikistan	3.30%	9.83%	2.57%	0.51%	16.21%
Uzbekistan	2.65%	4.65%	1.94%	0.58%	9.82%
<b>East and Southeast Asia</b>	<b>1.61%</b>	<b>3.22%</b>	<b>0.53%</b>	<b>0.17%</b>	<b>5.54%</b>
Cambodia	4.43%	0.95%	2.97%	0.36%	8.71%
PRC	1.39%	3.42%	0.44%	0.13%	5.39%
Indonesia	3.88%	0.98%	0.97%	0.35%	6.18%
Lao PDR	10.62%	0.00%	2.40%	0.60%	13.61%
Malaysia	1.94%	4.42%	0.27%	0.04%	6.68%
Mongolia	12.04%	0.00%	1.21%	0.21%	13.45%
Myanmar	2.70%	0.00%	1.46%	1.88%	6.04%
Philippines	2.30%	1.87%	1.22%	0.65%	6.04%
Thailand	0.58%	3.69%	0.45%	0.19%	4.91%
Viet Nam	2.07%	3.12%	2.38%	0.54%	8.12%
<b>South Asia</b>	<b>5.55%</b>	<b>3.03%</b>	<b>2.02%</b>	<b>0.39%</b>	<b>11.00%</b>
Bangladesh	4.92%	1.24%	4.22%	1.19%	11.56%
Bhutan	2.84%	0.00%	0.87%	0.36%	4.07%
India	5.67%	3.23%	1.87%	0.34%	11.12%
Nepal	1.65%	0.58%	5.14%	1.10%	8.48%
Sri Lanka	4.23%	1.00%	1.39%	0.22%	6.85%
<b>The Pacific</b>	<b>2.60%</b>	<b>0.00%</b>	<b>0.65%</b>	<b>0.30%</b>	<b>3.55%</b>
Fiji	1.01%	0.00%	0.53%	0.14%	1.68%
Kiribati	5.17%	0.00%	0.16%	0.32%	5.65%
PNG	3.30%	0.00%	0.73%	0.32%	4.35%
Samoa	3.33%	0.00%	1.12%	0.26%	4.70%
Solomon Is.	3.50%	0.00%	0.28%	0.35%	4.13%
Timor-Leste	0.00%	0.00%	0.07%	0.79%	0.86%
Tonga	2.29%	0.00%	1.13%	0.29%	3.71%
Vanuatu	2.92%	0.00%	0.92%	0.28%	4.13%
<b>Total Asia</b>	<b>2.30%</b>	<b>3.17%</b>	<b>0.82%</b>	<b>0.22%</b>	<b>6.52%</b>

Note: Estimates obtained using the low case scenario.

Source: Author, Centennial (2009)

## 5. INFRASTRUCTURE NEEDS FOR REGIONAL PROJECTS FOR ASIAN CONNECTIVITY: 2010-2020

The total investments required to meet demand for the identified 1202 regional projects is valued at approximately US\$320 billion, with an average infrastructure investment need of about US\$29 billion per year for the period 2010-2020 (Table 7). Of this total, needed investment in energy projects accounts for about 30% and transport 70%. This information is based on a consolidated list of various proposals that are considered both economically viable and likely to be implemented between 2010 and 2020<sup>5</sup>. The state of projects included varies greatly and some are much more advanced in their development than others. The data is compiled from a variety of sources—some much more detailed than others—and includes proposals at various levels of definition, preparation, review, and vetting. Also, some of the project information was acquired through anecdotal references where access to detailed feasibility reports and economic and financial evaluations for the projects was limited. The estimates of regional infrastructure investment needs in this paper, as shown in Table 7, include revised projections of some projects and 125 additional projects, which resulted in an increase of US\$34.0 billion compared with estimates provided previously in ADB/ADBI (2009).

**Table 7: Asia's Total Regional Indicative Investment Needs for Identified and Pipeline Infrastructure Projects by Regional/Sub-regional Program: 2010-2020 (US\$ Million)**

Regional / Sub-regional Program	Energy	Transport					Grand Total
		Airport / Port	Rail	Road	TF / Logistics	Total	
AH	-	-	-	17,425.0	-	17,425.0	<b>17,425.0</b>
TAR	-	-	107,469.0	-	-	107,469.0	<b>107,469.0</b>
ACP*	-	51,446.0	-	-	-	51,446.0	<b>51,446.0</b>
CAREC	15,667.0	1,347.7	5,131.3	12,932.9	9,925.1	29,337.0	<b>45,004.0</b>
GMS	2,603.8	200.0	1,523.0	3,972.0	163.0	5,858.0	<b>8,461.8</b>
ASEAN	11,583.0	-	16,800.0	-	-	16,800.0	<b>28,383.0</b>
BIMP-EAGA	100.0	-	-	-	-	-	<b>100.0</b>
SASEC	133.0	-	-	-	203.0	203.0	<b>336.0</b>
Other**	61,928.6	-	-	-	89.5	89.5	<b>62,018.1</b>
<b>Total</b>	<b>92,015.4</b>	<b>52,993.7</b>	<b>130,923.3</b>	<b>34,329.9</b>	<b>10,380.6</b>	<b>228,627.4</b>	<b>320,642.8</b>

\* ACP = Asian Container Ports

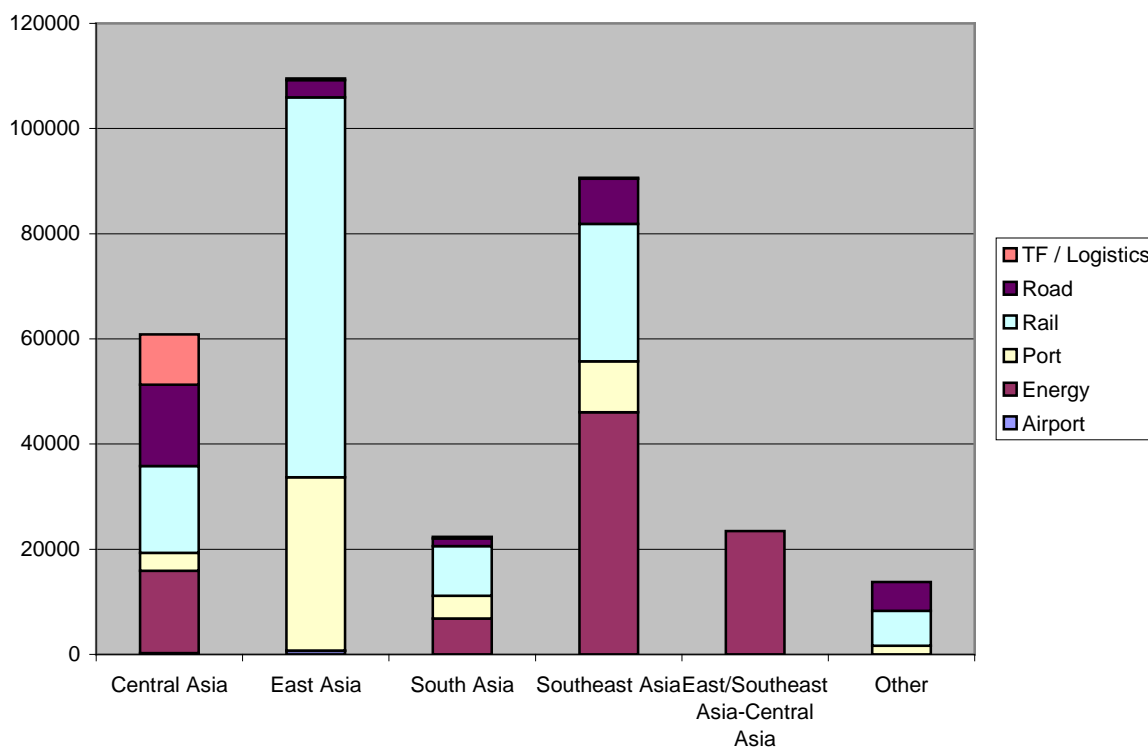
\*\* Includes projects connecting East/Southeast – Central – South Asia that do not explicitly fall under a sub-regional program.

Source: Author

The investment needs for regional projects are around 4% of total national infrastructure investment needs, which is comparable to Europe (see Van der Geest and Nunez-Ferrer 2010). Figure 4 presents the composite of the 1202 bilateral, sub-regional, and pan-Asian infrastructure projects that are planned and soon to be constructed, and that were included in this study.

<sup>5</sup> The complete compendium of projects is provided as Appendix 2 of this paper.

**Figure 4: Total Regional Investment Needs for Identified and Pipeline Infrastructure Projects by Region: 2010-2020 (US\$ Million)**



Source: Author

It is also evident from Figure 4 that the vast majority of financing demand for regional infrastructure investment falls within East and Southeast Asia—though Central Asia has this highest overall number of projects at 199. The investment needed for Asian transport sector projects amounted to US\$218 billion, more than 2.5 times the investment needed for energy projects. This contrasts with the pattern of national investment demand, where energy demand is 1.3 times the investment need for the transport sector. This may be due to the very complex nature of cross-border energy projects together with high investment requirements, the need for strong coordination and cooperation among participating countries, and the difficulties of harmonizing energy regulation among participating countries. Asian energy sectors are typically highly regulated.

The following subsections detail the investment requirements for regional projects in Asia at the pan-Asian and sub-regional levels.

### 5.1 Pan-Asian Transport Network

The pan-Asia transport network consists of highways, rails, airports, and container ports linking Asian countries as well as Asia to Eastern Europe and the Middle East. It includes the Asian Highways (AH), the Trans-Asian Railway (TAR), and Asian Container Ports (ACP) networks, and is estimated to need around US\$176.3 billion in investment over the coming decade. The AH network is a system of 141,000 km of standardized roadways crisscrossing 32 Asian countries with linkages to Europe. The 121 identified transport projects are expected to cost around US\$17.4 billion. The TAR network is comprised of almost 81,000 km of rail lines serving 28 countries, starting at the Pacific seaboard of Asia and ending in Europe. There were 85 projects identified within TAR, whose needs were estimated at about US\$107.5 billion. A large share of investment needed for TAR falls in the East Asian region, at US\$70.6 billion. These projects were chosen for their potential to facilitate international

trade between Asia (UNESCAP 2007). Additionally, a range of 765 container ports projects around Asia were identified and expected to cost a total of around US\$51.4 billion.

## 5.2 Infrastructure Projects at the Sub-regional Level

More than 60% of Asia's total energy investment needs are in the Southeast and Central Asia sub-regions. TAPI, the largest among these energy projects, will transport natural gas from the Dauletabad gas field in Turkmenistan through Afghanistan, Pakistan, and then to India. It is expected to carry 27 billion cubic meters (bcm) of natural gas annually. There are also 5 major power projects identified in Central and South Asia, some of which have links in Asia and Europe.

In Southeast Asia, 119 projects estimated to be about US\$61.6 billion belong to sub-regional groupings like GMS, ASEAN, and BIMP-EAGA. More than 60% of regional transport investment needs are in Viet Nam, followed by around 29% in the provinces of PRC. In the regional energy projects in the GMS, around 50% of the needed investments are in Lao PDR. Generally in the GMS sub-region, greater amounts of investment are needed in the transport sector. This could imply that in order to harness, share, and utilize the available resources found in each country, connectivity through transportation is very important.

The second largest investment project needed is identified by the CAREC. Central Asia is an historical land bridge that connects the East and West (East Asia and Europe) and the North and South (the Indian Ocean and the Persian Gulf to Russia and the Baltic). More than 40% of the planned cross-border infrastructure in the CAREC region is for transportation (mostly intra-regional road construction and upgrades), while the remaining majority is for cross-border energy. The identified energy projects comprise of oil pipelines, electricity transmission and distribution lines, and construction of hydropower plants, as well as the rehabilitation of existing lines and electricity power loss control infrastructure. Many of the identified projects involve Kazakhstan or Tajikistan or both.

Some of the indicative investment needs in South Asia are found under the SASEC program. Many of the projects in South Asia, aside from energy, are related to logistics and trade facilitation. This could emphasize the role of transport and communication infrastructure in the trade openness of countries in this sub-region. On the other hand, in the energy sector, around 80% of the investment needs are for renewable energy projects, including hydroelectric power projects in Nepal and Bhutan.

There are many projects in South Asia, Central Asia, and Southeast Asia (including ASEAN nations and East Asia), which have not been planned under pan-Asian and sub-regional, intergovernmental programs<sup>6</sup>. Though these projects may not have explicitly been planned or programmed under designated sub-regional or regional cooperation programs, they have been labeled under such programs in this study according to which countries are involved or participating jointly on a given project. For example, some energy projects, such as the Trans-Afghanistan Gas Pipeline (TAPI) and the Central Asia-China Natural Gas Pipeline do not belong to any specific sub-regional program as they cut across South Asia and Central Asia. Sections of these projects are included in their corresponding sub-regional programs based on the countries involved.

In this section, proposed projects (based on academic studies) in the Greater Tumen Initiative (GTI) are not included in the estimated total regional infrastructure needs. GTI projects were not included primarily because there has yet to be any form of formal government level agreement or commitment to these projects. However, with 47 proposed projects estimated at nearly US\$19 billion and involving trade and transport corridors spanning the Northeast Asia sub-region—from Eastern Russia to Korea and also including

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<sup>6</sup> See Appendix 1 for descriptions of the sub-regional programs included in this study.

Mongolia, PRC, and Korea—these projects could also be included in future when considering regional or pan-Asian infrastructure and connectivity (Kayahara 2003).

### 5.3 Investment Needs for High Priority Projects

The earlier section highlights more than 1202 regional projects with cost estimates. Based on ADB/ADBI (2009), Table 8 presents a list of high priority regional transport and energy projects costing an estimated \$15 billion under three sub-regional programs in Southeast Asia, Central Asia and South Asia. Projects were determined to fall in the “high priority” category if they were well defined, had progressed through necessary approval processes, and considered politically, technically, economically, and financially feasible. In GMS, there were 10 projects identified. Out of the five projects in the transport sector, four of these are road infrastructure. While in the energy sector, out of the five projects, three of these are transmission lines and two are hydropower projects. In the CAREC program, there were six projects identified mostly in the transport sector, estimated to be about US\$10 billion, or 65% of the total estimated cost of the twenty one priority projects. This figure is the largest among the sub-regions. In SASEC, the major projects include primarily transport and logistics, communication, tourism, and hydroelectric power projects.

The successful implementation of these priority projects could realize large benefits for participating countries and persuade more Asian economies to participate in regional projects with “win-win” benefits.

**Table 8: Twenty One High Priority “Flagship” Regional Projects**

Sub-region	Transport	Cost (in US \$ million)	Energy	Cost (in US \$ million)	Total No. of Projects	Total Cost (in US\$ million)
<b>GMS</b>	<b>5 projects</b>	<b>3,324</b>	<b>5 projects</b>	<b>1,414</b>	<b>10</b>	<b>4,738</b>
	GMS Kunming-Hai Phong Transport Corridor-Noi Bai-Lao Cao Highway	1,21	GMS Northern Power Transmission	54		
	2nd GMS Northern Transport Network Improvement	135	GMS Nabong-Udon Thani Power Transmission and Interconnection	110		
	Rehabilitation of the Railway in Cambodia	73	Lao PDR-Viet Nam Power Interconnection (Ban Sok-Pleiku)	270		
	Ha Long-Mong Cai Expressway	1,000	GMS Nam Ngiep 1 Hydropower Projec	380		
	GMS Hanoi-Lang Son Expressway	900	GMS Nam Ngum 3 Hydropower Projec	600		
<b>CAREC</b>	<b>4 projects (total)</b>	<b>9,043</b>	<b>2 projects (total)</b>	<b>1,072</b>	<b>6</b>	<b>10,115</b>
	CAREC Corridor 1b	6,700	Central Asia-South Asia Regional Electricity Market (CASAREM)	962		
	Caucasus Corridor:Armenia-Georgia Regional Transport	323	Regional Power Transmission Interconnection Project	110		
	CAREC Corridor 2	1,800				
	Western Regional Road Corridor Development Project-Mongolia	220				
<b>SASEC</b>	<b>3 projects (total)</b>	<b>293</b>	<b>2 projects (total)</b>	<b>279</b>	<b>5</b>	<b>572</b>

	SASEC Information Highway Project (Bangladesh, Bhutan, India, and Nepal)	24	Green Power Development (Bhutan)	234		
	Sub-regional Transport Logistics and Trade Facilitation Projects (Bangladesh, Bhutan, India, and Nepal)	179	West Seti Hydroelectric Project (Nepal)	45		
	Improving Connectivity and Destination Infrastructure for Sub-regional Tourism Development (Bangladesh, Bhutan, India, Nepal, and Sri Lanka)	90				
<b>Total</b>	<b>12 projects</b>	<b>12,660</b>	<b>9 projects (total)</b>	<b>2,764</b>	<b>21</b>	<b>15,424</b>

Source: Author's Compilation and ADB/ADBI (2009)

## 6. CHALLENGES FOR REGIONAL INFRASTRUCTURE FINANCING

Meeting huge financing needs of US\$776 billion per year for national (US\$747 billion) and regional (US\$29 billion) infrastructure during 2010-2020 is one of the largest challenges facing many developing countries in Asia. Asia is expansive and its economies diverse. Continuing to promote competitiveness and productivity by reducing trade and logistics costs, forming specialized industrial clusters, and enlarging and deepening production networks all need high quality national and regional infrastructure to succeed.

Using the most conservative estimate, the investment requirement for infrastructure at the national level is a staggering US\$8.3 trillion over the next decade. In order to attract finance, particularly from the private sector, there is a need, to translate this demand into “bankable”, commercially viable and profitable projects. Individual countries need to mobilize domestic resources for infrastructure development. However, low-income countries may be more dependent on regional and international capital markets and donors (including bilateral and multilateral development banks) for additional financing, particularly concessional financing.

Based on the “bottom-up” approach, the financing demand for the planned regional infrastructure projects that are economically viable is about US\$313 billion over period 2010-2020 for 1202 projects. Despite the limitations in available data and of the methodology, this paper provides a good illustration of infrastructure demand in Asia over the next eleven years. However, it is important to note that it is not possible to predict the exact duration and implementation of the planned projects that are in pipeline. The cost estimates are mostly based on the results of the feasibility studies of planned projects. Though the methodologies in estimating the national and regional investment needs are not fully comparable and may inherently overlap, it is interesting to note that regional investment needs are only 3.9% of national estimated needs.

The major challenge for Asia is to mobilize various available resources to finance “bankable” infrastructure projects and ensuring strong coordination and cooperation among various stakeholders at the national, sub-regional and regional level. This calls for an appropriate comprehensive approach to infrastructure development to facilitate regional infrastructure connectivity. This approach should address the need for the identification and preparation of priority bankable projects pipeline through a project development mechanism or framework

under a Pan-Asia Infrastructure Forum (see ADB/ADBI, 2009 and Bhattacharyay, 2010 for more details). It also requires development of innovative financing mechanism and modalities, as well as policy, regulation and capacity development (through human capital and institutional development) for participating countries. The capacity development for less developed countries is very important as the regional infrastructure performance is only as good as its weakest link or weakest participating country. Another chapter of the book addresses the issues and challenges and the role of Asian financial market integration in financing the infrastructure needs.

An interesting aspect of Asian economic diversity, and its particular potential for regional energy and water infrastructure, is that it consists of both resource surplus and deficient countries. For example, Nepal, Bhutan, Myanmar and Lao PDR represent energy surplus countries that could supply clean hydropower or natural gas to energy deficient countries in the region, like Bangladesh, India, Pakistan, Thailand, and Viet Nam. Additionally, Central Asian countries could supply gas and oil through pipelines to India, Pakistan, and PRC to feed growing demands there. There is an urgent need for regional cooperation in planning and implementing environment-friendly regional infrastructure projects to share these scarce resources for achieving energy and water security. In the face of the global financial crisis and resulting economic downturn, there is an increasing need for greater coordination of stimulus packages' in infrastructure investment in transport, energy, water, and ITC to ensure cross-border projects are efficiently developed for enhancing regional connectivity. Regional infrastructure projects for building an integrated Asia are essential to harness shared resources and efficiency in a cost-effective manner.

## REFERENCES

- Asian Development Bank (ADB). 2007. ADB's Infrastructure Operations-Responding to Client Needs. Manila: ADB.
- ADB. 2008a. Greater Mekong Sub-region, 2009-2011 Regional Cooperation Business Plan. Manila: ADB. September.
- . 2008b. Building a Sustainable Energy Future: The Greater Mekong Sub-region. Discussion Draft for the Final Regional Workshop. Bangkok, 5-6 June.
- . 2009a. Asian Development Bank Outlook 2009. Manila: ADB.
- . 2009b. Key Indicators 2009. Manila: ADB.
- Asian Development Bank Institute (ADBI). 2009. Demand for Infrastructure Financing in Asia 2010-2020. ADBI Internal Report (prepared by Centennial Group Holdings, LLC, Washington DC. Tokyo: ADBI.
- ADB/ADBI. 2009. Infrastructure for a Seamless Asia. Tokyo: ADBI.
- Asian Development Bank, Japan Bank for International Cooperation, World Bank (ADB-JBIC-WB). 2005. *Connecting East Asia: A New Framework for Infrastructure*. Washington D.C: World Bank.
- Aftab, M. 2008. TAPI Gas lines finalized. Khilafah.com. 26 April. Available:<http://www.khilafah.com/index.php/news-watch/archive/2616-tapi-gas-pipeline-finalised>.
- Alibaba.com. 2008. FACTBOX-Asian economies get billions in fiscal stimulus. 11 September 2008. Accessed online: <http://news.alibaba.com/article/detail/economy/100004213-1-factbox-asian-economies-get-billions-fiscal.html>, 28 January 2010.
- Association of Southeast Asian Nations (ASEAN). 2009. Fact Sheet. Available:<http://www.aseansec.org/19166.htm>
- ASEAN Center for Energy. 2005. ASEAN Plan of Action for Energy Cooperation (APAEC) 2004-2009. Available: [http://www.aseanenergy.org/ace/work\\_programme.htm](http://www.aseanenergy.org/ace/work_programme.htm)
- Bhattacharyay, B. N. 2008. Demand for Regional Infrastructure in Asia and the Pacific: 2010–2020. Background paper prepared for ADB/ADBI Flagship Study, “Infrastructure for a Seamless Asia”. Tokyo: ADBI.
- Bhattacharyay, B. N. 2010. Institutions for Asian Connectivity. ADBI Working Paper No. 220. Tokyo: ADBI.
- Bhattacharya A and S. Kojima.2008. Impact of Cross Border Energy Infrastructure Investment on Regional Environment, Society and Climate Change. Background Paper prepared for the study Infrastructure and Regional Cooperation. Tokyo: ADBI.
- Centennial Group Holdings. 2009. Estimating Infrastructure Demand for Asia and the Pacific 2010-2020. ADBI commissioned report. Tokyo: ADBI.
- Chatternton and Puerto. 2005. Estimation of the Investment Needs in the South Asia Region. Washington D.C.: World Bank.
- China Post. 2007. China National Petroleum Subsidiaries to Pay Billions for Central Asia Gas Pipeline. 30 December. Available: <http://www.chinapost.com.tw/china/business/2007/12/30/137003/China-National.htm>.
- Commission on Growth and Development. 2008. The Growth Report: Strategies for Sustained and Inclusive Growth. Washington D.C.: World Bank.



- Fay, M. 2001. Financing the Future: Infrastructure Needs in Latin America, 2000-2005. World Bank Working Paper No. 2545. Washington DC: World Bank.
- Foreign Affairs and International Trade Canada (FAITC). 2009. Worldwide inventory of infrastructure spending plans. 21 January 2009. Accessed online: <http://www.international.gc.ca/canadexport/articles/90121h.aspx>, 28 January 2010.
- Lawson, S. and R. Dragusanu. 2008. Building the World: Mapping Infrastructure Demand. Global Economics Paper No 166. New York: Goldman Sachs.
- Poddar, T. 2009. India Can Afford Its Massive Infrastructure Needs. Global Economics Paper No 187. New York: Goldman Sachs.
- International Federation of Consulting Engineers (IFCE). 2009. Fiscal Stimulus Package Survey 2009. Accessed online: <http://www1.fidic.org/about/infra09/>, 28 January 2010.
- International Monetary Fund (IMF). 2006. World Economic Outlook. Washington D.C.: The Fund. September 2006
- Kang, J. 2010. Meeting the Challenges of Financial Crisis—China's Practice: from Developing Countries' Prospective. Paper presented at the Conference on Global Financial and Economic Crisis Fiscal Policy Issues After the Crisis, Asian Development Bank Institute, Tokyo, 19 January 2010.
- Kathuria V. 2006. Promise of Transborder Gas Pipelines. The Hindu. 8 May. Available: <http://www.hindu.com/biz/2006/05/08>
- Kayahara, H. 2003. Current Status of Traffic Infrastructure and Prospects for Development. *Prospects of Northeast Asia Development*. Tokyo: Japan Institute of International Affairs.
- Kumar, R., and A. Soumya. 2010. Fiscal Policy Issues for India after the Current Crisis. Paper presented at the Conference on Global Financial and Economic Crisis Fiscal Policy Issues After the Crisis, Asian Development Bank Institute, Tokyo, 19 January 2010.
- Jitsuchon, S. 2010. Fiscal Policy Issues in Thailand after the Current Economic Crisis. Paper presented at the Conference on Global Financial and Economic Crisis Fiscal Policy Issues After the Crisis, Asian Development Bank Institute, Tokyo, 19 January 2010.
- Nguyen, N. A., D. N. Nguyen, and T. Nguyen. 2010. Current Global Crisis, Fiscal Stimulus Package and Implication for Viet Nam. Paper presented at the *Conference on Global Financial and Economic Crisis Fiscal Policy Issues After the Crisis*, Asian Development Bank Institute, Tokyo, 19 January 2010.
- Patunru, A. A., and E. Zetha. 2010. Indonesia's Savior: Fiscal, Monetary, Trade, or Luck? Paper presented at the Conference on Global Financial and Economic Crisis Fiscal Policy Issues After the Crisis, Asian Development Bank Institute, Tokyo, 19 January 2010.
- Sugimoto, K. 2010. A Study on Fiscal Policy Challenges in Japan. Paper presented at the *Conference on Global Financial and Economic Crisis Fiscal Policy Issues After the Crisis*, Asian Development Bank Institute, Tokyo, 19 January 2010.
- Times of India. 2010. India seeks fresh talks with Iran over gas pipeline. 19 April. <http://timesofindia.indiatimes.com/india/India-seeks-fresh-talks-with-iran-over-gas-pipeline/articleshow/5829884.cms> (Accessed 19 April 2010).
- United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). 2006. Priority Investment Needs for the Development of the Asian Highway Network. New York: UN
- . 2007. Review of Developments in Transport in Asia and the Pacific. New York: UN.

- . 2010a. UNESCAP Transport Division Website.  
Available: <http://www.unescap.org/ttdw/common/TIS/ALTID/Altid.asp>
- . 2010b. Asian Highways Map. UNESCAP Transport Division Website.  
Available: [http://www.unescap.org/ttdw/common/TIS/AH/maps/ah\\_map\\_latest.jpg](http://www.unescap.org/ttdw/common/TIS/AH/maps/ah_map_latest.jpg)
- . 2010c. Trans-Asian Railway Map. UNESCAP Transport Division Website.  
Available [http://www.unescap.org/ttdw/common/TIS/TAR/images/tarmap\\_latest.jpg](http://www.unescap.org/ttdw/common/TIS/TAR/images/tarmap_latest.jpg)
- Van der Geest, W., and J. Nunez-Ferrer. 2010. Managing multinational infrastructure: An Analysis of EU Institutional Structures and Best Practices. ADBI Working Paper (forthcoming). Tokyo: ADBI.
- Von Hippel D.F., and P. Hayes. 2001. Estimated Costs and Benefits of Power Grid Interconnections in North East Asia. San Francisco: Nautilus Institute.
- Vohra. S. 2008. US Concerns Over Iran-Pakistan-India Gas Pipeline. Payvand's Iran News. 18 June. Available: <http://www.payvand.com/news/08/jun/1158.html>.
- World Bank 2009. World Development Indicators 2009. Washington D.C.: World Bank.
- World Economic Forum. 2010. The Global Competitiveness Report 2009–2010. Geneva: WEF.
- Yepes, T. 2004. Expenditure on Infrastructure in East Asia Region, 2006-2010. Background document for EAP's flagship 2005. Washington, DC: World Bank.

## APPENDIX

### Appendix 1: Regional and Sub-regional Groupings and Infrastructure Cooperation Programs

Regional / Sub-regional Program	Note
<b>I Asian Highways (AH)</b> Afghanistan, Armenia, Azarbaijan, Bangladesh, Bhutan, Cambodia, PRC, Georgia, India, Indonesia, Iran, Kazakstan, Democratic People's Republic of Korea, Republic of Korea, Kyrgyz Republic, Lao PDR, Japan, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Russian Federation, Singapore, Sri Lanka, Tajikistan, Thailand, Turkey, Turkmenistan, Uzbekistan, and Viet Nam - The Intergovernmental Agreement on the Asian Highway Network was adopted on 18 November 2003 by an intergovernmental meeting held in Bangkok, was open for signature in April 2004 in Shanghai and entered into force on 4 July 2005.	
<b>II Trans-Asian Railway (TAR)</b> Azerbaijan, Bangladesh, Belarus, Cambodia, Democratic People's Republic of Korea, Georgia, India, Indonesia, Kazakhstan, Kyrgyz Republic, Lao PDR, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, PRC, Poland, Republic of Korea, Russian Federation, Tajikistan, Thailand, Turkey, Turkmenistan, Singapore, Sri Lanka, Uzbekistan, and Viet Nam - The Intergovernmental Agreement on the Trans-Asian Railway Network enters into force on 11 June 2009.	
<b>III ASEAN</b> 1 Brunei 2 Cambodia 3 Indonesia 4 Lao PDR 5 Malaysia 6 Myanmar 7 Philippines 8 Singapore 9 Thailand 10 Viet Nam	The Association of Southeast Asian Nations or ASEAN was established on 8 August 1967 in Bangkok by the five original Member Countries, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Brunei Darussalam joined on 8 January 1984, Viet Nam on 28 July 1995, Lao PDR and Myanmar on 23 July 1997, and Cambodia on 30 April 1999.

<b>IV</b>	<b>BIMP-EAGA</b>	A sub-regional growth area named the Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area or BIMP-EAGA. BIMP-EAGA was formally launched on March 24, 1994 and aims to increase trade, investments and tourism in the sub-region.
1	Brunei Darussalam	
2	Indonesia	
3	Malaysia	
4	Philippines	
<b>V</b>	<b>BIMSTEC</b>	Initially formed in Bangkok, Thailand, on 6 June 1997 with its name BIST-EC (Bangladesh, India, Sri Lanka, and Thailand Economic Cooperation). Myanmar later joined the organization at a special ministerial meeting held in Bangkok on 22 December 1997. Consequently, the name of the organization was changed to BIMST-EC.
1	Bangladesh	
2	Bhutan	
3	India	
4	Myanmar	
5	Nepal	
6	Sri Lanka	
7	Thailand	
<b>VI</b>	<b>CAREC</b>	The Central Asia Regional Economic Cooperation – CAREC – Program was initiated in 1997.
1	Afghanistan	
2	Azerbaijan	
3	PRC	
4	Mongolia	
5	Kazakhstan	
6	Kyrgyz Republic	
7	Tajikistan	
8	Uzbekistan	
<b>VII</b>	<b>GMS</b>	In 1992, with ADB's assistance, Greater Mekong Sub-region (GMS) consisting of six countries entered is a program of sub-regional economic cooperation, designed to enhance economic relations among the countries.
1	Cambodia	
2	PRC (Yunnan)	
3	Lao PDR	
4	Myanmar	
5	Thailand	
6	Viet Nam	
<b>VIII</b>	<b>SASEC</b>	The South Asia Sub-regional Economic Cooperation – SASEC – Program is helping transform challenges into opportunities in one of the world's poorest, most densely populated areas.
1	Bangladesh	
2	Bhutan	

- 3 India (Eastern States)
- 4 Nepal

## Appendix 2: Compendium of Investment Needs of Regional Infrastructure

### Projects by Sub-region and by Program

Total Number of Projects: 1202 (437 listed here + 756 unlisted ACP projects)

Region(s) Connected	Regional / Sub regional Program	Primary Country	Sector	Project	Investment Need (US\$ Million)
Central Asia	CAREC	Afghanistan	Airport	Rehabilitation of Regional Airports, Phase I	32.1
Central Asia	CAREC	Afghanistan	Energy	Transmission and distribution rehabilitation in power sector	1,500.0
Central Asia	CAREC	Afghanistan	Rail	Rail Feasibility Study (Hairatan-Mazare-e-Sharif-Herat and Shirkhan Bandar-Kunduz-Naibabad)	1.0
Central Asia	CAREC	Afghanistan	Rail	Rail Feasibility Study (Hairatan-Naibabad-Kabul-Torkham)	0.6
Central Asia	CAREC	Afghanistan	Rail	Rail Feasibility Study (Shntikh-Herat)	0.6
Central Asia	CAREC	Afghanistan	Road	Bala Murghab-Leman Road	180.0
Central Asia	AH	Afghanistan	Road	Balkh-Andkhoy	36.0
Central Asia	AH	Afghanistan	Road	Bridge over Ammou River	40.0
Central Asia	AH	Afghanistan	Road	Herat-Andkhoy	80.0
Central Asia	AH	Afghanistan	Road	Kabul-Bamiyan	40.0
Central Asia	CAREC	Afghanistan	Road	Kabul-Jalalabad Road Feasibility Study	0.8
Central Asia	AH	Afghanistan	Road	Kabul-Surubi	30.0
Central Asia	AH	Afghanistan	Road	Kandahar-Gereshk	76.0
Central Asia	CAREC	Afghanistan	Road	Leman-Armalick Road	30.0
Central Asia	CAREC	Afghanistan	Road	Naibabad-Hairatan Road	10.0
Central Asia	AH	Afghanistan	Road	Polekhumri-Hayratan	29.0
Central Asia	CAREC	Afghanistan	Road	Preparing the Road Network III	1.0
Central Asia	CAREC	Afghanistan	Road	Pul-e-Khumri-Doshi Road	10.0
Central Asia	CAREC	Afghanistan	Road	Qaisar-Bala Murghab Road	55.0

Central Asia	CAREC	Afghanistan	Road	Salang Tunnel Expansion Feasibility Study	2.0
Central Asia	CAREC	Afghanistan	TF / Logistics	Transport Sector Planning (All Modes)	1.0
Central Asia	TAR	Afghanistan / Iran	Rail	Sangan-Heart	127.0
Central Asia	CAREC	Azerbaijan	Energy	Rehab of the T&D system in the gas sector as well as gas flaring reduction	629.0
Central Asia	CAREC	Azerbaijan	Energy	Transmission lines and SS to improve capacity of Azeri-Russia-Georgia-Iran interconnection	132.0
Central Asia	CAREC	Azerbaijan	Port	Acquisition of High Capacity Ferries and Ro/Ros	69.0
Central Asia	CAREC	Azerbaijan	Port	Feasibility Study for New Alyat Port	1.0
Central Asia	TAR	Azerbaijan	Rail	Qazvin-Rasht-Anzali-Astara	12.4
Central Asia	CAREC	Azerbaijan	Rail	Railway Trade and Transport Facilitation	1,750.0
Central Asia	TAR	Azerbaijan	Rail	Server-Yug (North-South) International Transport Corridor	24.5
Central Asia	TAR	Azerbaijan	Rail	Traseka International Transport Corridor	699.4
Central Asia	CAREC	Azerbaijan	Road	East-West Highway Improvement	1,250.0
Central Asia	AH	Azerbaijan	Road	Goradiz-Gazi Mammed	74.0
Central Asia	AH	Azerbaijan	Road	Kazakh- Border of Georgia	20.0
Central Asia	AH	Azerbaijan	Road	Nakhchivan-Sadarak- Border of Turkey	46.0
Central Asia	AH	Azerbaijan	Road	Ring Road connecting AH5 and AH8 around Baku	20.0
Central Asia	CAREC	Azerbaijan	Road	Road Maintenance	0.8
Central Asia	CAREC	Kazakhstan	Airport	Expansion of Shymkent, Semey and Kokchetau Airports	163.0
Central Asia	CAREC	Kazakhstan	Energy	Caspian Littoral Gas Pipeline	700.0
Central Asia	CAREC	Kazakhstan	Energy	Eskene-Kuryk oil pipeline, Kuryk terminal, and oil tankers	1,100.0
Central Asia	CAREC	Kazakhstan	Energy	Kenkiyak-Kumkol oil pipeline	493.0
Central Asia	CAREC	Kazakhstan	Energy	Moinak hydropower	160.0
Central Asia	CAREC	Kazakhstan	Energy	Novorossiysk and Atyrau-Samara oil pipeline capacity expansion	1,287.0
Central Asia	CAREC	Kazakhstan	Energy	Second North-South transmission line	147.0
Central Asia	CAREC	Kazakhstan	Port	Expansion of Aktau Port	347.5
Central Asia	CAREC	Kazakhstan	Rail	Construction of Korgas-Zhetygen Rail Line	742.0
Central Asia	TAR	Kazakhstan	Rail	Electrification of Aktogai-Mointi Railway Section	258.0
Central Asia	TAR	Kazakhstan	Rail	Electrification of Almaty-Akogai Railway Section	250.0
Central Asia	TAR	Kazakhstan	Rail	Electrification of Doystek-Aktogai Railway Section	141.0

Central Asia	TAR	Kazakhstan	Rail	Electrification of Kandiagash-Makat	298.0
Central Asia	TAR	Kazakhstan	Rail	Epaliev-Kypik	62.0
Central Asia	TAR	Kazakhstan	Rail	Jezkazgan-Beiney	2,300.0
Central Asia	TAR	Kazakhstan	Rail	Korgas-Jetigen	775.0
Central Asia	TAR	Kazakhstan	Rail	Mangishlak-Baytino	190.0
Central Asia	TAR	Kazakhstan	Rail	Yzen-border of Turkmenistan	250.0
Central Asia	CAREC	Kazakhstan	Road	Aktau-Beyneu Road Rehabilitation	550.0
Central Asia	CAREC	Kazakhstan	Road	Almaty-Kapchagay Road Rehabilitation	580.0
Central Asia	CAREC	Kazakhstan	Road	Astana-Karaganda Road Rehabilitation	1,000.0
Central Asia	AH	Kazakhstan	Road	Border of Russian Federation (to Samara)-Pogodaeva-Shymkent-Almaty-Khorgos	347.0
Central Asia	AH	Kazakhstan	Road	Kaerak-Kostanai-Astana-Almaty-Khorgos	230.0
Central Asia	AH	Kazakhstan	Road	Kamenka-Ural'sk-Karabutak-Aralsk-Kyzylorda-Shymkent	628.0
Central Asia	AH	Kazakhstan	Road	Kotyaevka-Atyrau-Aktau-Border of Turkmenistan	374.0
Central Asia	CAREC	Kazakhstan	TF / Logistics	Coordinator for CAREC	0.1
Central Asia	CAREC	Kazakhstan	TF / Logistics	Rehabilitation of Western Europe-Western PRC Transit Corridor	6,561.0
Central Asia	CAREC	Kazakhstan	TF / Logistics	Transport Sector Services Study	0.1
Central Asia	CAREC	Kyrgyz Republic	Airport	Kyrgyz Air Traffic Control Capacity Enhancement	4.5
Central Asia	CAREC	Kyrgyz Republic	Airport	Rehabilitation of Osh Airport	40.0
Central Asia	CAREC	Kyrgyz Republic	Energy	Kambarata I hydropower	1,940.0
Central Asia	CAREC	Kyrgyz Republic	Energy	Kambarata II hydropower	240.0
Central Asia	CAREC	Kyrgyz Republic	Energy	Kemin-Datka-Khodjent transmission line	380.0
Central Asia	CAREC	Kyrgyz Republic	Energy	Transmission and distribution rehabilitation in natural gas sector	40.0
Central Asia	CAREC	Kyrgyz Republic	Energy	Transmission and distribution rehabilitation in power sector	200.0

Central Asia	TAR	Kyrgyz Republic	Rail	Balkchy-Kochor-Kara-Keche	136.4
Central Asia	TAR	Kyrgyz Republic	Rail	Balykchi - Arpa	2,000.0
Central Asia	TAR	Kyrgyz Republic	Rail	China-Krygyzstan-Uzbekistan	1,400.0
Central Asia	CAREC	Kyrgyz Republic	Rail	Electrification of Bishkek-Balykchy Railway	100.0
Central Asia	CAREC	Kyrgyz Republic	Rail	Equipment Purchase for Wagon Repair/Maintenance Facility	4.0
Central Asia	TAR	Kyrgyz Republic	Rail	Kara-Keche-Arpa	570.0
Central Asia	TAR	Kyrgyz Republic	Rail	Kashi-Torugart-Arpa-Uzgen	2,100.0
Central Asia	TAR	Kyrgyz Republic	Rail	Lugovaya-Balykchy railway	65.0
Central Asia	TAR	Kyrgyz Republic	Rail	Procurement of equipment for van repair ships	4.0
Central Asia	CAREC	Kyrgyz Republic	Rail	Track Rehabilitation Project (Chaldovar-Balykchy)	65.0
Central Asia	TAR	Kyrgyz Republic	Rail	Use of electric-traction on Lugovaya-Bishkek railway	100.0
Central Asia	AH	Kyrgyz Republic	Road	Bishkek-Naryn-Torougart	173.0
Central Asia	CAREC	Kyrgyz Republic	Road	Bishkek-Torugart Road Rehabilitation	300.0
Central Asia	CAREC	Kyrgyz Republic	Road	CAREC Regional Road Corridor Improvement (Sary Tash-Karamik)	39.5
Central Asia	AH	Kyrgyz Republic	Road	Osh-Isfana	133.0
Central Asia	CAREC	Kyrgyz Republic	Road	Reconstruction of Taraz-Talas-Suusamyrd Road	31.8
Central Asia	AH	Kyrgyz Republic	Road	Road around Lake Issyk-Kul and connection to AH Balykchy-Cholpon-Ata-Karakol-Bokonbaevo-Balykchy	131.0



Central Asia	CAREC	Kyrgyz Republic	Road	Southern Transport Road Rehabilitation (Osh-Sary Tash-Irkeshtan)	170.0
Central Asia	AH	Kyrgyz Republic	Road	Taraz-Talas-Susamyr	60.0
Central Asia	TAR	Pakistan	Rail	Dalbandin-Gwadar	933.0
Central Asia	AH	Pakistan	Road	Dualization of Hassanabdal-Abbottabad-Mansehra	51.0
Central Asia	AH	Pakistan	Road	Gwadar-Turbat-Hoshab-Awaran-Khuzdar section	271.0
Central Asia	AH	Pakistan	Road	Hub-Uthal	27.0
Central Asia	AH	Pakistan	Road	Hyderabad-Mirpurkhas-Umarkot-Khokhropar	50.0
Central Asia	AH	Pakistan	Road	Improvement of Dalbandin-Naushki section	34.0
Central Asia	AH	Pakistan	Road	Improvement of Kuchlac-Zhob	60.0
Central Asia	AH	Pakistan	Road	Improvement of Sibi-Sariab	68.0
Central Asia	AH	Pakistan	Road	Lakpass Tunnel	9.0
Central Asia	AH	Pakistan	Road	National Highway N-70 (Multan-Muzafargarh; Muzaffargarh Bypass; Muzafargarh & Bewatta)	103.0
Central Asia	AH	Pakistan	Road	Sehwan-Dadu-Ratodero	103.0
Central Asia	CAREC	Regional	Airport	Emergency Compliance with ICAO Requirements	6.0
Central Asia	CAREC	Regional	Airport	Needs Assessment of Central Asian Civil Aviation	3.0
Central Asia	CAREC	Regional	Airport	Training of CAREC Experts in Aviation Safety to ICAO Standards	2.0
Central Asia	CAREC	Regional	Energy	Central Asia-South Asia Regional Electricity Market (CASAREM)	962.0
Central Asia	CAREC	Regional	Energy	Regional Power Transmission Interconnection Project	109.5
Central Asia	ACP	Regional	Port	NA	3022
Central Asia	CAREC	Regional	Port	Needs Assessment of Caspian Shipping Along CAREC Corridors	1.0
Central Asia	CAREC	Regional	Rail	Supporting Management of Cross Border Railway Operations	1.5
Central Asia	CAREC	Regional	Road	CAREC Transport Corridor 1b	6,700.0
Central Asia	CAREC	Regional	Road	Collaborative Regional Operations and Maintenance of Corridors	0.8
Central Asia	CAREC	Regional	Road	Common CAREC Approach to Road Vehicle Emission Standards	0.8
Central Asia	CAREC	Regional	Road	Developing Inter-country Bus Services	0.5

Central Asia	CAREC	Regional	Road	Equitable Road Maintenance User Charges and Cross Border Fees	1.0
Central Asia	CAREC	Regional	Road	Establishment of Third-Party Motor Vehicle Liability Insurance Regime	0.3
Central Asia	CAREC	Regional	Road	Financing Renewal of Vehicle Fleets and Equipment	0.5
Central Asia	CAREC	Regional	Road	International Road Transport Conventions and CAREC Agreements	1.0
Central Asia	CAREC	Regional	Road	Regional Road Corridor Safety Auditing	0.8
Central Asia	CAREC	Regional	TF / Logistics	Assistance in Implementation of WCO Recommendations for Customs	3.0
Central Asia	CAREC	Regional	TF / Logistics	Border Crossing Point Infrastructure and Investment	500.0
Central Asia	CAREC	Regional	TF / Logistics	Border Post Improvements and Joint Border Processing	200.0
Central Asia	CAREC	Regional	TF / Logistics	CAREC Trade Portal	0.6
Central Asia	CAREC	Regional	TF / Logistics	CAREC Transport Corridor 2	1,800.0
Central Asia	CAREC	Regional	TF / Logistics	Caucasus Corridor (Armenia-Georgia Regional Transport Project)	323.0
Central Asia	CAREC	Regional	TF / Logistics	Coordinating Cargo Processing through a National Single Window	0.2
Central Asia	CAREC	Regional	TF / Logistics	Corridor Performance Monitoring and Reporting	3.0
Central Asia	CAREC	Regional	TF / Logistics	Cross Border Agreements Among the PRC, KGZ, and TAJ	0.6
Central Asia	CAREC	Regional	TF / Logistics	Customs Modernization and Infrastructure Development	22.8
Central Asia	CAREC	Regional	TF / Logistics	Development of Coordinated National Transport Policies	1.7
Central Asia	CAREC	Regional	TF / Logistics	Development of Logistics Centers and Rail Multimodal Hubs	3.0
Central Asia	CAREC	Regional	TF / Logistics	Development of Multimodal Transport Systems	0.2
Central Asia	CAREC	Regional	TF / Logistics	Development of Multimodal Transportation along CAREC Corridors	1.0

Central Asia	CAREC	Regional	TF / Logistics	Enhancements of IT Systems at Customs	5.0
Central Asia	CAREC	Regional	TF / Logistics	Facilitating Border Crossing for Drivers, Traders, and Migrant Workers	0.5
Central Asia	CAREC	Regional	TF / Logistics	Facility and Process Improvements at Border Crossing Points	2.0
Central Asia	CAREC	Regional	TF / Logistics	Institutional Support for Transport and Trade Facilitation	6.0
Central Asia	CAREC	Regional	TF / Logistics	Liability Insurance System for Transport Operators	0.1
Central Asia	CAREC	Regional	TF / Logistics	Periodic Survey of Measures Affecting the Movement of Goods	0.8
Central Asia	CAREC	Regional	TF / Logistics	Product Certification Capability and Weighing Machine Standards	0.1
Central Asia	CAREC	Regional	TF / Logistics	Promote Containerization	1.0
Central Asia	CAREC	Regional	TF / Logistics	PSP in Transport Development and Trade Facilitation	3.0
Central Asia	CAREC	Regional	TF / Logistics	Rail and Intermodal Transport Feasibility Study for PRC-KGZ-UZB	0.6
Central Asia	CAREC	Regional	TF / Logistics	Reducing Transport Costs to Boost Trade	0.2
Central Asia	CAREC	Regional	TF / Logistics	Regional Customs Training and Development	2.0
Central Asia	CAREC	Regional	TF / Logistics	Simplified Transit Procedures	0.2
Central Asia	CAREC	Regional	TF / Logistics	Standardized Cargo Declaration and Other Harmonized Requirements	0.2
Central Asia	CAREC	Regional	TF / Logistics	Strengthening Capabilities of National Certification Agencies	1.0
Central Asia	CAREC	Regional	TF / Logistics	Strengthening Customs Guarantee Systems	0.3
Central Asia	CAREC	Regional	TF / Logistics	Supply Chain Training Institute	0.5
Central Asia	CAREC	Regional	TF / Logistics	Survey of Taxes and Charges Applicable to Transport Operators	0.1

Central Asia	CAREC	Regional	TF / Logistics	Trade and Industrial Logistic Centers with Information Exchange System	150.0
Central Asia	CAREC	Tajikistan	Energy	Fon Yagnob coal fired plant and mine	1,500.0
Central Asia	CAREC	Tajikistan	Energy	Loss reduction in power and gas sectors	262.0
Central Asia	CAREC	Tajikistan	Energy	North-South transmission line	81.0
Central Asia	CAREC	Tajikistan	Energy	Rehab of Nurek, Golovnaya, Varzob Cascade hydropower plants	200.0
Central Asia	CAREC	Tajikistan	Energy	Rogun Storage hydropower	2,450.0
Central Asia	CAREC	Tajikistan	Energy	Sangtuda II hydropower	150.0
Central Asia	CAREC	Tajikistan	Energy	Sangtuda I-Peshawar CASAREM transmission line	500.0
Central Asia	CAREC	Tajikistan	Energy	Yavan hydropower	210.5
Central Asia	TAR	Tajikistan	Rail	Access line to Kunduss (Afghanistan)	64.0
Central Asia	CAREC	Tajikistan	Rail	Dushanbe-Kyrgyz Border Railway Feasibility Study	0.6
Central Asia	TAR	Tajikistan	Rail	Electrification of Nau-Kanibadam Line section	110.0
Central Asia	CAREC	Tajikistan	Rail	Kolkhazabad-Nizhni Pianj Railway	0.6
Central Asia	TAR	Tajikistan	Rail	Modernization of telecoms and fiber optic cable	20.2
Central Asia	TAR	Tajikistan	Rail	New line Kolkhozabad-Nizhniy Pianj	55.0
Central Asia	CAREC	Tajikistan	Rail	Railway Electrification (Bekabad-Kanibadam)	0.6
Central Asia	TAR	Tajikistan	Rail	Renovation of 142 km Khoshadi-Kurgan Tube line	28.4
Central Asia	TAR	Tajikistan	Rail	Vachdat-Yavan	NA
Central Asia	CAREC	Tajikistan	Rail	Vahdat-Yavan Railway Feasibility Study	0.6
Central Asia	AH	Tajikistan	Road	Ajni-Pendzhikent	4.0
Central Asia	CAREC	Tajikistan	Road	Dushanbe-Khujand-Chanak-Uzbeki Border Road	150.0
Central Asia	CAREC	Tajikistan	Road	Dushanbe-Kyrgyz Border Road Rehabilitation, Phase II	39.5
Central Asia	CAREC	Tajikistan	Road	Dushanbe-Kyrgyz Border Road Rehabilitation, Phase III	85.5
Central Asia	CAREC	Tajikistan	Road	Dushanbe-Tursunzade-Uzbek Border Road	100.0
Central Asia	AH	Tajikistan	Road	Khujand-Buston	2.0
Central Asia	AH	Tajikistan	Road	Khujand-Dushanbe	23.0
Central Asia	AH	Tajikistan	Road	Khujand-Kanibadam-Isfara	2.0
Central Asia	AH	Tajikistan	Road	Korog-Border of Kyrgyzstan (to Sary Tash)	67.0
Central Asia	AH	Tajikistan	Road	Kurgan Tube-Nizhiny Panj	4.0
Central Asia	CAREC	Tajikistan	Road	Kurgan Tyube-Dusti-Nizhni Pianj Road Rehabilitation	90.0
Central Asia	CAREC	Tajikistan	Road	Transport Sector Master Plan	0.8
Central Asia	CAREC	Uzbekistan	Airport	Upgrading the Bukhara Airport	0.6

Central Asia	CAREC	Uzbekistan	Energy	Bukhara-Ural gas pipeline and Central Asia Center-Russia gas pipeline reinforcement	114.0
Central Asia	CAREC	Uzbekistan	Energy	Sogdiana SS-Talimardjan TPP transmission line	95.0
Central Asia	CAREC	Uzbekistan	Energy	Surhand SS-Guzar SS transmission line	57.5
Central Asia	CAREC	Uzbekistan	Rail	Acquisition of New Locomotives	25.0
Central Asia	CAREC	Uzbekistan	Rail	Angren-Pap Railway Feasibility Study	0.6
Central Asia	CAREC	Uzbekistan	Rail	Electrification of Kashi-Tashguzar Baisun-Kumgurgan Section	180.0
Central Asia	CAREC	Uzbekistan	Rail	Electrification of Navoi-Bukhara and Bukhara-Kashi Sections	195.0
Central Asia	CAREC	Uzbekistan	Rail	Electrification of Navoi-Uchkuduk Section	180.0
Central Asia	CAREC	Uzbekistan	Rail	Electrification of Samarkand-Navoi and Samarkand-Kashi Sections	185.0
Central Asia	CAREC	Uzbekistan	Rail	Electrification of Tashkent-Angren Railway Feasibility Study	0.6
Central Asia	CAREC	Uzbekistan	Rail	Regional Railway	50.0
Central Asia	AH	Uzbekistan	Road	Andijon-Tashkent-Syrdaria	82.0
Central Asia	AH	Uzbekistan	Road	Bukhara-Navoi-Samarkand-Syrdaria-Tashkent	38.0
Central Asia	CAREC	Uzbekistan	Road	CAREC Regional Road Improvement	173.5
Central Asia	AH	Uzbekistan	Road	Nukus-Bukhara-Kashkadarya	240.0
Central Asia	AH	Uzbekistan	Road	Tashkent-Syrdaria-Samarkand-Surhandarya	80.0
Central Asia	AH	Uzbekistan	Road	Termez-Uzun	40.0
East Asia	CAREC	Mongolia	Airport	Improvement of Olgiy and Hovd Airports	25.0
East Asia	CAREC	Mongolia	Airport	New International Airport in Ulaanbaatar	280.0
East Asia	CAREC	Mongolia	Airport	Rehabilitation of Regional Airports	0.5
East Asia	CAREC	Mongolia	Energy	Distribution rehabilitation and power system loss reduction	27.5
East Asia	TAR	Mongolia	Rail	Capacity Strengthening of Mongolian Railway	189.0
East Asia	TAR	Mongolia	Rail	Eastern Region Railway Network	NA
East Asia	TAR	Mongolia	Rail	Gobi Region Railway Network	NA
East Asia	CAREC	Mongolia	Rail	Modernization of the Mongolia Railway	189.0
East Asia	TAR	Mongolia	Rail	Sukhbaatar-Zamin Uud 2nd Rail Line	2,900.0
East Asia	TAR	Mongolia	Rail	Zamin Uud Intermodal Terminal	NA
East Asia	AH	Mongolia	Road	Eastern Link: Baganuur-Ondorhaan-Choibalsan-Sumber-Border of China	152.0

East Asia	CAREC	Mongolia	Road	Ulaanbaatar-Russian Border Road Rehabilitation	120.0
East Asia	AH	Mongolia	Road	Ulaanbaishint-Ulgii-Khovd-Bulgan-Yarant	114.0
East Asia	AH	Mongolia	Road	Western Link: Ulaanbaatar-Hovd	188.0
East Asia	CAREC	Mongolia	Road	Western Regional Road	200.0
East Asia	CAREC	Mongolia	TF / Logistics	Comprehensive Master Plan for Development of Zamyn-Uud	0.7
East Asia	CAREC	Mongolia	TF / Logistics	Customs Modernization	6.8
East Asia	CAREC	Mongolia	TF / Logistics	Development Plan for Tsaganuur Free Trade Zone	0.3
East Asia	CAREC	Mongolia	TF / Logistics	Establishment of Altanbulag Free Trade Zone	90.0
East Asia	CAREC	Mongolia	TF / Logistics	Establishment of Zamyn-Uud Free Trade Zone	100.0
East Asia	CAREC	Mongolia	TF / Logistics	Improvement of Tsaganuur Free Trade Zone	30.0
East Asia	CAREC	Mongolia	TF / Logistics	Regional Logistics Development	0.5
East Asia	CAREC	Mongolia	TF / Logistics	Ulaanbaatar Intermodal Logistics Park Feasibility Study	0.9
East Asia	CAREC	PRC	Airport	Xinjiang Airport Development	372.5
East Asia	CAREC	PRC	Rail	Double Tracking: Wuxi-Jinghe Rail Line	394.0
East Asia	CAREC	PRC	Rail	Electrification of Urumqi-Ala Shankou Rail Line	190.0
East Asia	CAREC	PRC	Rail	Jinghe-Yining-Khorgas Railway	875.0
East Asia	TAR	PRC	Rail	Jinghong-Tachilek-Denchai	701.5
East Asia	TAR	PRC	Rail	Kashi-Torugart-Arpa-Uzgen	1,000.0
East Asia	TAR	PRC	Rail	Lashio-Muse-Ruili-Dali	2,162.0
East Asia	TAR	PRC	Rail	Xiangun-Yuxi-Mohan-Thanaleng	2,980.0
East Asia	AH	PRC	Road	Jinghong-Daluo	60.0
East Asia	AH	PRC	Road	Jinghong-Mohan	1,160.0
East Asia	AH	PRC	Road	Kashi-Honqiraf	70.0
East Asia	AH	PRC	Road	Lhasa-Zhangmu	140.0
East Asia	CAREC	PRC	Road	Lianyungang-Khorgas Expressway (Guozhigou and Qin Shui He)	393.0
East Asia	CAREC	PRC	Road	Road Construction (Jinghe-Ala Shankou)	70.0

East Asia	CAREC	PRC	Road	Xinjiang Regional Road Improvement (Korla-Kuqa)	594.0
East Asia	CAREC	PRC	TF / Logistics	Khorgas Global Logistics Center	100.0
East Asia	CAREC	PRC	TF / Logistics	Logistics Development and Capacity Building in XUAR	0.6
East Asia	CAREC	PRC	TF / Logistics	Regional Customs Cooperation	0.4
East Asia	ACP	Regional	Port	NA	32953
East Asia	TAR	Republic of Korea	Rail	Honam Line	10,500.0
East Asia	TAR	Republic of Korea	Rail	Kyoubu Line	7,200.0
East Asia	TAR	Republic of Korea	Rail	National Railway Development Plan	43,000.0
East/Southeast Asia-Central Asia	Other	Regional	Energy	Central Asia-China Natural Gas (Turkmenistan-PRC Gas Pipeline)	2,200.0
East/Southeast Asia-Central Asia	Other	Regional	Energy	Iran-Pakistan-India (IPI) Natural Gas Pipeline	7,500.0
East/Southeast Asia-Central Asia	Other	Regional	Energy	Myanmar-Bangladesh-India (MBI) Gas Pipeline	1,000.0
East/Southeast Asia-Central Asia	Other	Regional	Energy	Myanmar-India Hydro Power Project	5,175.0
East/Southeast Asia-Central Asia	Other	Regional	Energy	Turkmenistan-Afghanistan-Pakistan-India (TAPI) Gas Pipeline Project	7,600.0
Other	AH	Armenia	Road	Bavra-Gumri	5.0
Other	AH	Armenia	Road	Border of Azerbaijan-Agarak-Meghri-Border of Azerbaijan	25.0
Other	AH	Armenia	Road	Goris-Agarak (Border of Islamic Republic of Iran)	56.0
Other	AH	Armenia	Road	Vaik-Gorhayq	30.0
Other	TAR	Armenia / Iran	Rail	Gagarin-Meghri	2,000.0
Other	TAR	Georgia	Rail	Coastal Line Batumi-Kobuleti	25.0

Other	TAR	Georgia	Rail	Connecting rail networks of Georgia & Turkey	215.0
Other	TAR	Georgia	Rail	Kulevi Oil Terminal	NA
Other	TAR	Georgia	Rail	Senaki-Poti Line	25.0
Other	TAR	Georgia	Rail	Tbilisi-Poti Line	450.0
Other	AH	Georgia	Road	Mtskheta-Kazbegi-Larsi	39.0
Other	AH	Georgia	Road	Poti-Batumi-Sarpi	123.0
Other	AH	Georgia	Road	Poti-Tbilisi-Red Bridge	2,300.0
Other	TAR	Georgia / Turkey	Rail	Akhalkalaki-Kars	420.0
Other	TAR	Iran	Rail	Arak-Khosravi	820.0
Other	TAR	Iran	Rail	Qazvin-Rasht-Anzali-Astara	969.0
Other	AH	Iran	Road	Bazargan – Tabriz Freeway	250.0
Other	AH	Iran	Road	Khorramabad – Andimeshk	200.0
Other	AH	Iran	Road	Qazvin – Saveh Freeway	135.0
Other	AH	Iran	Road	Qeshm Bridge in Persian Gulf	349.0
Other	AH	Iran	Road	Sirjan – Bandar Abbas	290.0
Other	ACP	Regional	Port	NA	1637
Other	AH	Russian Federation	Road	Border of Ukraine-Kursk-Voronezh-Saratov-Border of Kazakhstan	30.0
Other	AH	Russian Federation	Road	Bridge over Kigach river in Astrakhan-Atyrau road section	11.0
Other	AH	Russian Federation	Road	Moscow-Khabarovsk-Vladivostok	950.0
Other	AH	Russian Federation	Road	Moscow-Tambov-Volgograd-Astrakhan-Mahachkala	300.0
Other	AH	Russian Federation	Road	Yekaterinburg-Tumen-Ishim-Omsk	60.0
Other	TAR	Turkey	Rail	Electrification Projects	346.9
Other	TAR	Turkey	Rail	Kars-Tbilisi-Baku Railway Line	420.0
Other	TAR	Turkey	Rail	Procurement of Ferrries, Piers Extension, Establishment of Maintenance & Repair Facility	67.0
Other	TAR	Turkey	Rail	Signaling Projects	866.5
Other	TAR	Turkey	Rail	Tatvan-Van	NA
Other	AH	Turkey	Road	Gerede-Merzifon	350.0



South Asia	TAR	Bangladesh	Rail	Dohazari-Gundum (border with Myanmar)	NA
South Asia	TAR	Bangladesh	Rail	Double tracking Akhaura-Laksham/Dhaka-Laksham chord line	200.0
South Asia	TAR	Bangladesh	Rail	Double tracking Chinkiastana-Laksham section, including signaling	70.0
South Asia	TAR	Bangladesh	Rail	Line capacity improvement Dhaka-Tongi through intermediate block signaling	5.0
South Asia	TAR	Bangladesh	Rail	Strengthening of Jamuna Bridge for higher axle load	25.0
South Asia	TAR	Bangladesh	Rail	Upgrading of signaling at 18 stations along Abdulpur-Parbatipur section (West Zone)	22.0
South Asia	TAR	Bangladesh	Rail	Upgrading of signaling at 19 stations along Chittangong-Akhaura section (West Zone)	25.0
South Asia	AH	Bangladesh	Road	Beldanga-Panchagarh	9.0
South Asia	AH	Bangladesh	Road	Chittagong-Cox's Bazar-Ramu-Gundam	144.0
South Asia	AH	Bangladesh	Road	Dasuria-Paksey-Kushtia	4.0
South Asia	AH	Bangladesh	Road	Four laning of Daukandi-Chittagong	191.0
South Asia	AH	Bangladesh	Road	Jhenaidah-Jessore	5.0
South Asia	AH	Bhutan	Road	Phuentsholing-Thimphu double laning	60.0
South Asia	TAR	India	Rail	Dedicated Freight Corridors	7,800.0
South Asia	TAR	India	Rail	Jiribam-Kalay	649.0
South Asia	TAR	India	Rail	Moreh (India)/Tamu (Myanmar)	649.0
South Asia	AH	India	Road	India-Nepal border	1.0
South Asia	AH	India	Road	Madurai-Dhanushkodi	2.0
South Asia	AH	India	Road	Shillong-Dwaki	6.0
South Asia	AH	India	Road	Siliguri-Fulbari Mod-Border of Bangladesh	2.0
South Asia	AH	Nepal	Road	Kathmandu-Birgunj ICD link road	80.0
South Asia	AH	Nepal	Road	Naubise-Thankot (Tunnel)-Kathmandu-Kodari improvement and upgrading	24.0
South Asia	AH	Nepal	Road	New Koshi bridge at Chatara and widening of bridges in Pathalaiya-Dhalkebar	31.0
South Asia	Other	Regional	Energy	Bangladesh-Bhutan-Nepal-India Multilateral Power Line Interconnection	9.0
South Asia	Other	Regional	Energy	Bangladesh-India Power Project (Tata Group Proposal)	1,025.0
South Asia	Other	Regional	Energy	Bhutan-India HPP Projects	3,744.1

South Asia	Other	Regional	Energy	Green Power Development (Bhutan)	234.5
South Asia	SASEC	Regional	Energy	India-Sri Lanka Grid Connection	133.0
South Asia	Other	Regional	Energy	West Seti Hydroelectric Project (NEP)	1,700.0
South Asia	ACP	Regional	Port	NA	4309
South Asia	Other	Regional	TF / Logistics	Improving Connectivity and Destination Infrastructure for Sub regional Tourism Development	89.5
South Asia	SASEC	Regional	TF / Logistics	SASEC Information Highway Project (Bangladesh, Bhutan, India and Nepal)	24.0
South Asia	SASEC	Regional	TF / Logistics	Sub-regional Transport Logistics & Trade Facilitation Project (Bangladesh)	23.0
South Asia	SASEC	Regional	TF / Logistics	Sub-regional Transport Logistics & Trade Facilitation Project (Bhutan)	48.0
South Asia	SASEC	Regional	TF / Logistics	Sub-regional Transport Logistics & Trade Facilitation Project (India)	50.0
South Asia	SASEC	Regional	TF / Logistics	Sub-regional Transport Logistics & Trade Facilitation Project (Nepal)	58.0
South Asia	TAR	Sri Lanka	Rail	Coast Line	NA
South Asia	TAR	Sri Lanka	Rail	Connecting Line	NA
South Asia	TAR	Sri Lanka	Rail	Northern Line	NA
South Asia	AH	Sri Lanka	Road	Land bridge connecting Sri Lanka and India	880.0
South Asia	AH	Sri Lanka	Road	Talaimannar-Medawachchiya	36.0
Southeast Asia	TAR	Cambodia	Rail	Bat Deng-Loc Ninh-HCM City	480.0
Southeast Asia	TAR	Cambodia	Rail	Poipet-Sisophon-Aranyaprathet	80.0
Southeast Asia	GMS	Cambodia	Rail	Rehabilitation of the Railway	73.0
Southeast Asia	AH	Cambodia	Road	Banlung (Rattanak Kiri)-Oyadav- Viet Nam Border	27.0
Southeast Asia	AH	Cambodia	Road	Battambang-Palin-Thailand Border	40.0
Southeast Asia	AH	Cambodia	Road	Neak Leoung Mekong River Bridge	200.0
Southeast Asia	AH	Cambodia	Road	NR7 Jct at Pratheath to Chhlong	20.0
Southeast Asia	AH	Cambodia	Road	NR7 Jct to Banlung (Rattanak Kiri)	44.0
Southeast Asia	AH	Cambodia	Road	Preak Kdam-Thnal Keng	6.0
Southeast Asia	AH	Cambodia	Road	Siem Reap-Stung Treng	260.0
Southeast Asia	AH	Cambodia	Road	Snoul to Sen Monorom (Mondulkiri)-Lumphat (Rattanak Kiri)	117.0
Southeast Asia	AH	Indonesia	Road	Improvement and upgrading of various sections (AH25)	15.0

Southeast Asia	AH	Indonesia	Road	Improvement and upgrading of various sections (AH2)	14.0
Southeast Asia	TAR	Lao PDR	Rail	Bua Yai-Savannakhet	6.3
Southeast Asia	TAR	Lao PDR	Rail	Ubonratchatani-Dong Ha	710.0
Southeast Asia	TAR	Lao PDR	Rail	Vientiane-Tan Ap	732.0
Southeast Asia	TAR	Lao PDR	Rail	Xiangun-Yuxi-Mohan-Thanaleng	1,000.0
Southeast Asia	AH	Lao PDR	Road	Oudomaxay-Muangkhua-Tai Chang	40.0
Southeast Asia	AH	Lao PDR	Road	Phiafai-Attapeu ( NH18A)	23.0
Southeast Asia	GMS	Lao PDR	Road	Route14A: Junction Route 16-Lao PDR/Cambodian border	33.0
Southeast Asia	GMS	Lao PDR	Road	Route16A: Junction Route 16 Junction Route 11	34.0
Southeast Asia	GMS	Lao PDR	Road	Second GMS Northern Transport Network Improvement: Luangprabang-Thanh Hoa	40.0
Southeast Asia	GMS	Lao PDR	TF / Logistics	GMS East-West Corridor	23.0
Southeast Asia	TAR	Myanmar	Rail	Jinghong-Tachilek-Denchai	436.0
Southeast Asia	TAR	Myanmar	Rail	Jiribam-Kalay	296.0
Southeast Asia	TAR	Myanmar	Rail	Lashio-Muse-Ruili-Dali	759.0
Southeast Asia	TAR	Myanmar	Rail	Thanphyuzayat-Namtok	246.0
Southeast Asia	AH	Myanmar	Road	Kyaing Tong-Takaw-Loilem-Taunggyi	23.0
Southeast Asia	AH	Myanmar	Road	Monywa-Kalay/Kalewa	40.0
Southeast Asia	AH	Myanmar	Road	Myawadi (Border of Thailand)-Kawkareik	19.0
Southeast Asia	AH	Philippines	Road	Candelaria Bypass	5.0
Southeast Asia	AH	Philippines	Road	Cebu North Coastal Road	6.0
Southeast Asia	AH	Philippines	Road	Cotabato City Bypass	7.0
Southeast Asia	AH	Philippines	Road	Daraga Diversion Road	9.0
Southeast Asia	AH	Philippines	Road	Davao City Coastal Road	6.0
Southeast Asia	AH	Philippines	Road	Digos City Bypass	4.0
Southeast Asia	AH	Philippines	Road	General Santos City Bypass	9.0
Southeast Asia	AH	Philippines	Road	Koronadal City Bypass	6.0
Southeast Asia	AH	Philippines	Road	Palo Bypass	2.0
Southeast Asia	AH	Philippines	Road	Panabo City Bypass	6.0
Southeast Asia	AH	Philippines	Road	San Jose City Bypass	8.0
Southeast Asia	AH	Philippines	Road	Santiago City Bypass	2.0
Southeast Asia	AH	Philippines	Road	Sariaya Bypass	5.0
Southeast Asia	AH	Philippines	Road	Sipocot-Putiao Diversion Road	36.0

Southeast Asia	AH	Philippines	Road	Tagum City Bypass	8.0
Southeast Asia	AH	Philippines	Road	Tiaong Bypass	2.0
Southeast Asia	AH	Philippines	Road	Tuguegarao City Bypass	5.0
Southeast Asia	ASEAN	PRC	Energy	Jinghong dam on the upper Mekong in PRC's Yunnan province	1200
Southeast Asia	GMS	PRC	Rail	Mengzhi-Hekou railway line	1,450.0
Southeast Asia	GMS	PRC	Road	Lao PDR-Myanmar: Bridge over Mekong bet. Xieng Kok & Kyaing Lap inc. access road	34.0
Southeast Asia	GMS	PRC	Road	Western Yunnan Roads Development II	250.0
Southeast Asia	Other	Regional	Energy	Batam (Indonesia)-Singapore PTL Project	177.0
Southeast Asia	BIMP-EAGA	Regional	Energy	BIMP-EAGA Renewable Energy Investment Fund	100.0
Southeast Asia	GMS	Regional	Energy	Cambodia: Transmission Line-220kV link between Kampot and Shihanoukville	52.4
Southeast Asia	Other	Regional	Energy	Cambodia-Viet Nam; Sambor CPEC HPP	1,059.0
Southeast Asia	GMS	Regional	Energy	Developing the Regional Transmission and Regulatory Authority	1.0
Southeast Asia	GMS	Regional	Energy	Lao PDR: GMS Northern Power Transmission	53.5
Southeast Asia	GMS	Regional	Energy	Lao PDR-Cambodia-Viet Nam Power Interconnection: A Study	1.3
Southeast Asia	GMS	Regional	Energy	Lao PDR-Thailand: GMS Nabong-Udon Thani Power Transmission and Interconnection	110.0
Southeast Asia	GMS	Regional	Energy	Lao PDR-Thailand: Nam Ngiep 1 261 MW Hydropower Project	380.0
Southeast Asia	GMS	Regional	Energy	Lao PDR-Thailand: Nam Ngum 3 440 MW Hydropower Project	600.0
Southeast Asia	GMS	Regional	Energy	Lao PDR-Thailand: Xe Pian-Xenamnoy 390 MW Hydropower Project	400.0
Southeast Asia	Other	Regional	Energy	Lao PDR-Thailand; Nam Ngum HPP	1,401.0
Southeast Asia	Other	Regional	Energy	Lao PDR-Thailand; NAM Theun 2 HPP	2,478.0
Southeast Asia	Other	Regional	Energy	Lao PDR-Thailand; Xe Khaman 1	1,066.0
Southeast Asia	Other	Regional	Energy	Lao PDR-Thailand; Xe Pian HPP	888.0
Southeast Asia	Other	Regional	Energy	Lao PDR-Viet Nam PTL Project	118.0
Southeast Asia	GMS	Regional	Energy	Lao PDR-Viet Nam: GMS 500 kV Lao PDR-Viet Nam Interconnection (Ban Sok-Pleiku)	270.0

Southeast Asia	Other	Regional	Energy	Malaysia-Brunei PTL Project	18.0
Southeast Asia	Other	Regional	Energy	Malaysia-West Kalimantan PTL	18.0
Southeast Asia	Other	Regional	Energy	Myanmar-Thailand; Tasang HPP	8,200.0
Southeast Asia	GMS	Regional	Energy	Nam kong 1 (Lao PDR) 100 MW Hydropower Project	250.0
Southeast Asia	GMS	Regional	Energy	Nam Mo-Ban Mai Interconnection Project	14.4
Southeast Asia	Other	Regional	Energy	Peninsular Malaysia-Sumatra	143.0
Southeast Asia	ASEAN	Regional	Energy	Power market/power trade system development	183
Southeast Asia	GMS	Regional	Energy	PRC-Thailand Power Transmission through Lao PDR	70.0
Southeast Asia	Other	Regional	Energy	PRC-Thailand; Jinghong HPP	3,417.0
Southeast Asia	Other	Regional	Energy	PRC-Thailand; Nuozhadu HPP	12,528.0
Southeast Asia	ASEAN	Regional	Energy	Private sector mobilization for large hydro dam and transmission line construction	800
Southeast Asia	ASEAN	Regional	Energy	Regional transmission lines and switching stations;	2400
Southeast Asia	GMS	Regional	Energy	Sub regional Strategy for Cooperation in Renewable Energy	1.2
Southeast Asia	Other	Regional	Energy	Thailand-Cambodia Transmission PTL	7.0
Southeast Asia	Other	Regional	Energy	Thailand-Lao PRD PTL	125.0
Southeast Asia	Other	Regional	Energy	Thailand-Myanmar PTL	91.0
Southeast Asia	ASEAN	Regional	Energy	Trans-ASEAN Gas Pipeline	7000
Southeast Asia	Other	Regional	Energy	Viet Nam-Cambodia PTL	7.0
Southeast Asia	GMS	Regional	Energy	Viet Nam-PRC (Yunnan) 500kV Power Interconnection	400.0
Southeast Asia	ACP	Regional	Port	NA	9525
Southeast Asia	ASEAN	Regional	Rail	Cambodia-Lao PDR-Viet Nam	1800
Southeast Asia	ASEAN	Regional	Rail	Lao PDR-PRC	1100
Southeast Asia	ASEAN	Regional	Rail	Lao PDR-PRC	5700
Southeast Asia	ASEAN	Regional	Rail	Lao PDR-Viet Nam-Thailand	1100
Southeast Asia	ASEAN	Regional	Rail	Lao PDR-Viet Nam-Thailand	1100
Southeast Asia	ASEAN	Regional	Rail	Myanmar-Thailand-PRC	6000
Southeast Asia	TAR	Thailand	Rail	Bua Yai-Savannakhet	900.0
Southeast Asia	TAR	Thailand	Rail	Jinghong-Tachilek-Denchai	650.0
Southeast Asia	TAR	Thailand	Rail	Poipet-Sisophon-Aranyaprathet	0.5
Southeast Asia	TAR	Thailand	Rail	Thanphyuzayat-Namtok	491.0
Southeast Asia	TAR	Thailand	Rail	Ubonratchatani-Dong Ha	288.0
Southeast Asia	GMS	Thailand	Road	Highway Expansion Project	230.0
Southeast Asia	GMS	Viet Nam	Port	Van Phong Deep Sea Port	200.0

Southeast Asia	TAR	Viet Nam	Rail	Bat Deng-Loc Ninh-HCM City	350.0
Southeast Asia	TAR	Viet Nam	Rail	Ubonratchatani-Dong Ha	226.0
Southeast Asia	TAR	Viet Nam	Rail	Vientiane-Tan Ap	143.0
Southeast Asia	AH	Viet Nam	Road	Bien Hoa-Vung Tau Expressway (4-6 lanes)	600.0
Southeast Asia	AH	Viet Nam	Road	Da Nang-Quang Ngai (4 lanes)	700.0
Southeast Asia	GMS	Viet Nam	Road	Dau Giay-Lien Khuong Expressway	600.0
Southeast Asia	GMS	Viet Nam	Road	GMS Ha Long-Mong Cai Highway	1,000.0
Southeast Asia	GMS	Viet Nam	Road	GMS Southern Coastal Road Corridor II	140.0
Southeast Asia	AH	Viet Nam	Road	Ha Noi Ring Road	600.0
Southeast Asia	AH	Viet Nam	Road	Ha Noi-Hai Phong Expressway (4-6 lanes)	410.0
Southeast Asia	GMS	Viet Nam	Road	Ha Noi-Lang Son Expressway	300.0
Southeast Asia	AH	Viet Nam	Road	Ha Noi-Lao Cai Expressway	600.0
Southeast Asia	GMS	Viet Nam	Road	Kunming-Haiphong Transport Corridor-Noi Bai-Lao Cai Hway	1,216.0
Southeast Asia	AH	Viet Nam	Road	Rehabilitation of Soai Rap Assess Channel in Ho Chi Minh City	120.0
Southeast Asia	AH	Viet Nam	Road	Sai Gon-Long Thanh-Dau Day (4-6 lanes)	350.0
Southeast Asia	GMS	Viet Nam	Road	Second GMS Northern Transport Network Improvement: Luangprabang-Thanh Hoa	95.0
Southeast Asia	AH	Viet Nam	Road	Van Phong Transshipment Hubport	200.0
Southeast Asia	AH	Viet Nam	Road	Vinh-Cau Treo rehabilitation	44.0
Southeast Asia	GMS	Viet Nam	TF / Logistics	GMS East-West Corridor	140.0
<b>TOTAL</b>					<b>320,642.8</b>