

Financing Infrastructure for Connectivity: Policy Implications for Asia

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Financing Infrastructure for Connectivity: Policy Implications for Asia¹

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¹ This paper is based on Bhattacharyay 2010b



1 ■ Introduction

There has been unprecedented growth in Asia in the last two decades, largely stemming from the region's role as the world's factory through the development of an international production network (Roy and Hallenbeck 2010). Rapid infrastructure development has been a major factor behind this growth. Efficient infrastructure can increase availability of goods and services, ideas, innovation, knowledge, technology, and capital in an efficient manner, and thus improve the competitiveness and productivity of a region. In view of the reduced demand for Asia's exports as a result of the ongoing global financial and economic crisis, Asia needs to enhance regional demand and intraregional trade by developing infrastructure to increase connectivity and economic integration. Enhanced infrastructure connectivity can deepen and widen regional production networks, thereby making Asia more resilient to financial and economic shocks arising outside the region.

This paper will first discuss Asia's infrastructure needs and its corresponding financing needs and challenges. It will then propose ways to address financing gaps by identifying potential financing sources and instruments.



2. Infrastructure Needs in Asia

The rapid economic and population growth of Asian economies in recent years has put huge pressure on infrastructure, particularly in the transportation, energy, water, sanitation and communications sectors, and created an urgent need to reduce the huge infrastructure shortfall. About 1.5 billion Asians have no access to decent sanitation, 640 million have no access to clean water, 930 million have no access to electricity, and 7 out of 10 have no access to a telephone (Asian Development Bank [ADB]–Asian Development Bank Institute [ADBI] 2009). This shocking lack of infrastructure not only limits future growth of Asian economies but is also a threat to competitiveness, stability and poverty reduction in Asian countries (ADB–ADBI 2009). The challenge now is to build better connection within and among Asian countries for meeting basic needs such as water, sanitation, electricity, transport, and telecommunications, as well as for trade facilitation and further integration of regional production networks.

In responding to the current global financial crisis, Asia should pay attention to the lessons of the Asian financial crisis of 1997–1998. At that time, infrastructure programs were among the first to be cut in developing Asian economies, such as Indonesia, the Republic of Korea, Malaysia, and the Philippines. This cut in infrastructure investment has hindered growth, particularly in Indonesia and the Philippines (ADB–ADBI 2009). With the recent global financial crisis, many Asian governments



have been trying to stimulate domestic demand and alleviate the adverse impact of the crisis on regional exports by directing a large part of their fiscal stimulus packages to key sectors of infrastructure, such as transportation, energy, water, sanitation, and information and communication technology. Part of the rationale of such investment is not only to stimulate domestic economies but also enhance regional connectivity, thereby increasing regional demand (see Box 1 for the key reasons for enhancing infrastructure investment). However, the key issue is that the cost associated with these investments is large and goes beyond the financial capacities of the less-developed countries in Asia.

Box 1. The Global Crisis Provides Six Reasons for Increasing Infrastructure Investment in Asia

Increasing infrastructure investment has the following effects:

1. It enhances competitiveness, productivity, and economic recovery and helps to sustain growth in the medium-to-long term.
2. It increases standards of living and reduces poverty through enhancing connectivity and providing basic services.
3. It narrows the development gap within and among Asian economies.
4. It promotes environmental sustainability by implementing green projects.
5. It helps to increase national and regional connectivity, regional demand, investment and intraregional trade for rebalancing Asia's growth.

Source: Author, and ADB-ADBI (2009)



3. Financing Challenges

The costs of addressing these infrastructure needs are huge, as illustrated in Tables 1 and 2. Asia will need to invest approximately US\$8.22 trillion in overall national infrastructure for energy, transport, telecommunications, water, and sanitation from 2010 to 2020, and about US\$320 billion on more than 1,200 regional infrastructure projects in transport, energy, and telecommunications (Bhattacharyay 2010a).² Looking at different regions, it can be seen that East and Southeast Asia together account for more than 50% of the total required investment. In East and Southeast Asia and Central Asia, investment needs are highest in the electricity sector (58.2% of required investment in East and Southeast Asia and 44.7% in Central Asia), whereas in South Asia the need is highest in the transportation sector (50.5%).

Table 1: National Infrastructure Investment Needs in Asia, 2010–2020 (2008 US\$ billion)

Sector or Subsector	East and Southeast Asia		South Asia		Central Asia		Pacific		Total
	(value)	(%)	(value)	(%)	(value)	(%)	(value)	(%)	
Electricity	3,182.46	58.2	653.67	28.6	167.16	44.7	...		4,003.29
Transportation	1,593.87	29.1	1,196.12	50.5	104.48	28	4.41	73.3	2,898.87
Tele-communications	524.75	9.6	435.62	18.4	78.62	21	1.11	18.4	1,040.10
Water and sanitation	171.25	3.1	85.09	3.6	23.40	6.3	0.51	8.5	280.24
Total	5,472.33	100.0	2,370.50	100.0	373.66	100.0	6.02	100.0	8,222.50

Source: Bhattacharyay 2010a

² Regional infrastructure is defined as projects that involve physical construction works and/or coordinated policies and procedures spanning two or more neighboring countries. Also included are national infrastructure projects that have significant cross-border impacts in the areas of cooperation with one or more countries, regional trade, and networking with neighboring countries (ADB–ADBI 2009).



Table 2: Asia's Total Regional Indicative Investment Needs for Identified and Pipeline Infrastructure Projects by Regional or Subregional Program, 2010–2020 (US\$ million)

Regional or Subregional Program	Energy	Transport				Total	Grand Total
		Airport/Port	Rail	Road	TF/Logistics		
Asian highways				17,425.0		17,425.0	17,425.0
Trans-Asian Railway			107,469.0			107,469.0	107,469.0
Asian container ports		51,446.0				51,446.0	51,446.0
Central Asia Regional Economic Cooperation	15,667.0	1,347.7	5,131.3	12,932.9	9,925.1	29,337.0	45,004.0
Greater Mekong Subregion	2,603.8	200.0	1,523.0	3,972.0	163.0	5,858.0	8,461.8
Association of Southeast Asian Nations (ASEAN)	11,583.0		16,800.0				28,383.0
Brunei–Indonesia–Malaysia–Philippines East ASEAN Growth Area	100.0						100.0
South Asia Subregional Economic Cooperation	133.0				203.0	203.0	336.0
Other ^a	61,928.6				89.5	89.5	62,018.1
Total	92,015.4	52,993.7	130,923.3	34,329.9	10,380.6	228,627.4	320,642.8

Note: Regional pipeline infrastructure consists of 1,202 bilateral, subregional, and pan-Asian infrastructure projects.

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

Source: Bhattacharyay (2010a)

Given this huge requirement, this policy brief proposes that one of the possible ways to bridge financial gaps is to tap Asia's large savings and international reserves and to channel them into infrastructure investment. In 2009, the total annual savings of the 11 major Asian economies were approximately US\$3.39 trillion, while foreign exchange reserves totaled US\$4.69 trillion.³ This huge financial resource may provide an effective solution to the financial gap problem.

³ These economies are the People's Republic of China; Hong Kong, China; India; Indonesia; Japan; the Republic of Korea; Malaysia; Philippines; Singapore; Taipei, China; and Thailand.



4. Failure of Asian Economies to Fill Financing Gaps

The major impediments to infrastructure financing include lack of adequate public funds in many developing economies of Asia, risks and uncertainties associated with cross-border investment, and deficiencies in the planning and implementation of various national and regional infrastructure projects. Cross-border investment in regional projects is generally perceived to be more risky and complex compared to national projects, with uncertainties on how to recover funds or resolve commercial disputes and to harmonize heterogeneous domestic policies and regulations. Associated with this is the lengthy implementation process which exposes investors to exchange rate and liquidity risks as well as political risks, thereby discouraging cross-border investment. Furthermore, lack of appropriate legal, regulatory, and governance frameworks, along with cumbersome systems and procedures, will increase political, legal, financing, and regulatory risks. Political uncertainties or discrimination against foreign investors are also detrimental to cross-border infrastructure investment. These concerns are precisely why governments traditionally manage infrastructure financing; however, these issues can be addressed through the development of proper policies, regulations, and institutions, such as those envisioned in the East Asian Community blueprint.⁴

⁴ The Economic Research Institute for ASEAN and East Asia is preparing the East Asian Community blueprint for integration of trade and infrastructure and supporting institutions and policies. Harmonization of commercial and legal codes and adjudication of business disputes under a conflict resolution framework are key parts of the agenda.



5. Addressing the Financing Gap

There are three major objectives of financing infrastructure in Asia. The first is to meet huge and growing basic needs. The second is to focus on Asian integration through enhanced regional connectivity as well as develop and implement regional infrastructure projects that have large benefits for all participating countries. The last is to mobilize Asia's large financial and technical resources to meet its large investment needs in infrastructure. Furthermore, financing requirements are so vast that multiple sources of funding from the public and private sectors are needed.

Potential Sources of Financing

Public Funding: Economic Stimulus Packages

Public funding has traditionally been the major funding source for infrastructure projects. Asian economies usually respond to the economic financial crisis with economic stimulus packages to increase domestic demand and alleviate the impact of the crisis. Often, the bulk of these stimulus packages are intended to provide public infrastructure such as railways, ports, and roads. The objective of such infrastructure investment is not only to help economic recovery but also to promote economic growth by connecting isolated communities with the economic and industrial centers of countries and with the rest of the region.

In order to cope up with 2008 global financial crisis, several Asian economies have adopted strong economic (or fiscal) stimulus



packages. These packages will continue to be critical sources of infrastructure funding in coming years, especially if the crisis is prolonged. In many countries, particularly those with high public debt and budget deficits, the government may not be in a position to provide further fiscal stimulus. These governments can set up national infrastructure funds or issue infrastructure bonds with long maturity by sectors (e.g., roads, railways, ports, electricity, gas, and telecommunications) with appropriate incentive schemes to mobilize funds from the private sector. The mobilization of national financial resources should be the top priority.

Pan-Asian and Subregional Infrastructure Funds

A pan-Asian infrastructure fund and/or series of subregional infrastructure funds can be created to enhance Asia's connectivity and to move towards the creation of a seamlessly connected Asia. These funds could be based on multidonor platforms, and can be utilized to collect and administer the large accumulations of official financial assets and private savings. In addition, they can develop bankable projects based on the list of priority projects. For example, Asia could establish an Asian infrastructure fund, with capital coming from a variety of sources such as governments, multilateral development banks (MDBs), bilateral agencies, the private sector, sovereign wealth funds, Islamic and pension funds. The infrastructure fund could be managed under an appropriate governance structure such as a trust fund. The infrastructure fund should also have a legal identity so as to help finance projects through its own resources as well as by issuing bonds or through cofinancing with other entities (ADB–ADBI 2009). Given its long experience in developing and financing infrastructure in Asia, ADB can be a potential manager of these funds.



Asia currently has many subregional initiatives such as the Association of Southeast Asian Nations (ASEAN), Central Asia Regional Economic Cooperation, and Greater Mekong Subregion. Subregional funds can be created to fund projects under these programs. One example of such subregional fund is the proposed ASEAN Infrastructure Fund (with initial capital of US\$800 million), which was approved by ASEAN finance ministers on 11 May 2010 (*Vietnam Business and Economy News* 2010) and is expected to be operational in 2011.

Multilateral and Bilateral Development Banks

Multilateral development banks such as ADB and the World Bank, and bilateral agencies such as the Japan International Cooperation Agency (JICA)⁵ are already playing an important role in infrastructure development through the funding of various infrastructure projects. These institutions can further reduce the financing gaps from their own resources by mobilizing long-term funds through capital markets, explicit guarantees, and special cofinancing arrangements. Moreover, MDBs can also encourage private sector participation by introducing innovative financial instruments useful for public–private partnership (PPP) projects and assisting countries to improve the business environment through developing appropriate policies, regulations and institutions.

Capital Markets: Local Currency Bond Markets

An integrated and efficient capital market is essential for free movement of capital across Asia for infrastructure development. Development of bond markets, particularly local currency bond

⁵ JICA is an independent government agency that coordinates official development assistance for the Government of Japan.



markets, is one of the ways to reduce foreign currency risks and minimize maturity mismatches. Asian economies have undertaken various efforts in this regard. The Asian Bond Market Initiative, which was introduced in 2003, is an ASEAN+3⁶ initiative that aims to develop efficient bond markets in Asia, thereby enabling the private and public sectors to raise capital and to undertake long-term investments without currency and maturity risks. Such initiatives can promote the utilization of Asia's savings and foreign exchange reserves for infrastructure development in Asia, which is long-term in nature. MDBs may also be involved by issuing local currency bonds by undertaking currency swaps. For these bonds to be appealing to the private sector, returns and other incentives should be attractive.

Regional Infrastructure Companies for Financing Specific Sectors

Another financing option is to have regional companies manage and finance regional infrastructure projects. These companies could be owned by Asian governments as well as relevant regional public and private sector firms with adequate expertise in infrastructure development. They could raise funds from capital markets through equity or infrastructure bonds. The sale of public shares throughout the region would help deepen equity markets and provide a needed outlet for household savings and institutional investment funds. Further, companies could own subsidiaries specializing in sectors such as transport, energy, and telecommunications. This alternative may take a form similar to the European Aeronautic Defence and Space Company, which is

⁶ ASEAN+3 consists of the ASEAN member countries plus the PRC, Japan, and the Republic of Korea.



a large pan-European aerospace corporation⁷ owned by public and private sector.

As previously discussed, special subregional infrastructure funds such as the ASEAN and CAREC infrastructure funds could be created to finance subregional projects. In line with this, special subregional companies could be established to manage these infrastructure projects, operating in a similar way to regional infrastructure companies.

Sovereign Wealth Funds

Another potential source of funding for Asian cross-border infrastructure investment is sovereign wealth funds including pension funds, derived from a country's central bank reserves (from budget and trade surpluses or revenues generated from exports of natural resources).⁸ Due to the size of infrastructure projects, long-term tenor, competitive returns, and investment guarantees, sovereign wealth funds can be a good source of funding.

Potential Infrastructure Financing Instruments

Guaranteed and Linked Bonds

Infrastructure projects can be financed by bonds that include guarantees or enhancements to protect investors from various risks (such as fluctuating exchange rates and inflation), insulate borrowers from adverse changes in servicing costs, and customize issues to

⁷ The European Aeronautic Defence and Space Company was formed by the merger of DaimlerChrysler Aerospace AG (DASA) of Germany, Aérospatiale-Matra of France, and Construcciones Aeronáuticas SA (CASA) of Spain on 10 July 2000. It develops and markets civil and military aircraft, as well as communications systems, among other things.

⁸ Asian sovereign wealth funds include the China Investment Corporation in the PRC, Khazanah in Malaysia, Temasek in Singapore, and the State Capital Investment Corporation in Viet Nam.



fit the specific needs of lenders and borrowers. New innovative instruments should be created to appeal to different classes of borrowers who are facing various risks and concerns (Table 3).

Table 3: Types of Risk and Mitigating Instruments

Risk	Instrument
Exchange risk	Exchange rate guarantees; currency baskets
Inflation risk	Inflation-linked instruments
Commodity price risk	Commodity price-linked instruments
Credit risk	Credit guarantees
Demand (traffic) risk	Demand (traffic) guarantees
Economic risk	GDP-linked instruments ^a

GDP = gross domestic product

^a GDP-linked bonds lower debt service payments in times of economic distress, helping governments avoid default from revenue-related fiscal shortfalls, and offer investors premium returns if GDP growth is strong.

Source: Bhattacharyay 2010b

Mobilizing Funds from Islamic Financial Markets

The *sukuks* (Islamic bonds), issued by the Islamic Development Bank (IDB) as well as through Islamic financial markets in the Middle East and Malaysia, can possibly be used for infrastructure development.⁹ A consideration must be how IDB programs might evolve to provide more support for infrastructure. In the past few years, the IDB has begun issuing *sukuks* in international capital markets, which introduces the possibility for future issuing of bonds focused on infrastructure development.

However, the challenge in Islamic finance is the limited access of some Muslim communities to basic banking services. Increasing

⁹ The IDB has a mandate to promote economic development and social progress in its member countries individually and jointly in accordance with the principles of Islamic law. The main principles include prohibition on taking or receiving interest (but this does not preclude a return on investments), sharing of risk between providers and recipients of capital in return for a share in profit, prohibition of speculation, ensuring that no party to a financial transaction is exploited, and ensuring that investments are directed towards creating or increasing productive capacity.



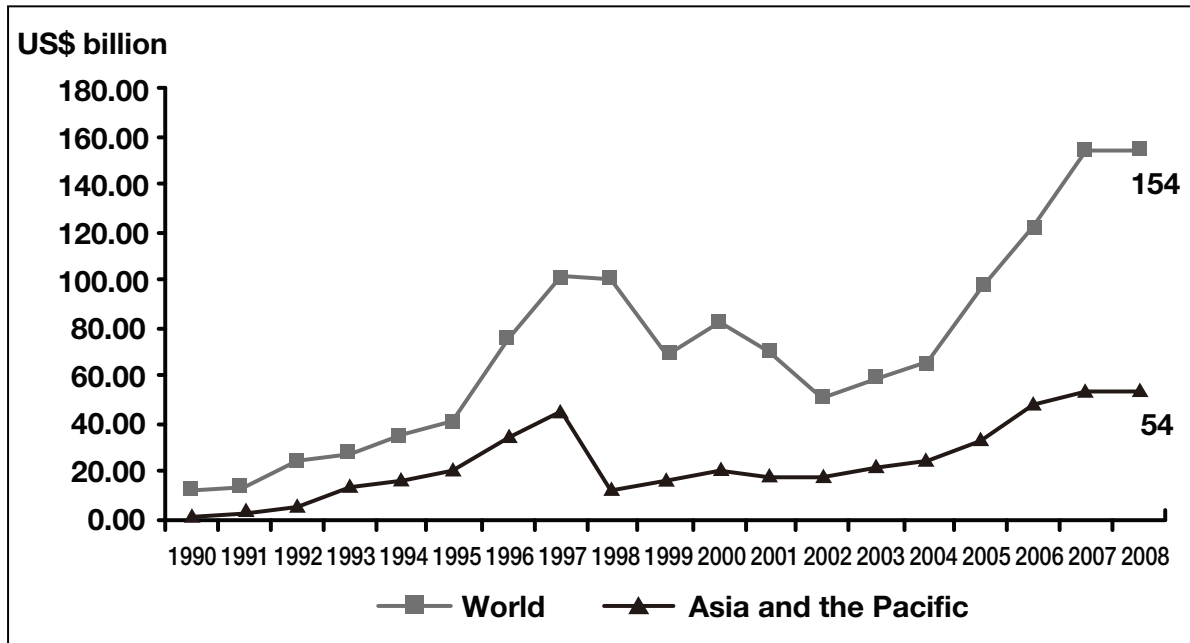
access of the large Asian Muslim population will not only alleviate poverty but also mobilize savings to help support infrastructure investments. Another issue that needs to be addressed is the lack of standardization of instruments due to varying *Shariah* (Islamic law) interpretations, as well as the fact that infrastructure projects tend to involve sharing the profit or loss on specific projects. Significant funds for infrastructure investment should be available through Islamic bond and equity markets in Malaysia and the Middle East. However, this requires consultations during the planning stages of projects on how to configure financial packages to meet *Shariah* requirements and to appeal to Islamic investors.

Public–Private Partnerships (PPP)

While the public sector is still expected to shoulder the bulk of infrastructure financing, it is necessary for the private sector to fill the gaps that can not be met by the public sector. Historically, PPPs have played an important role in funding infrastructure in various regions. During 1990–2008, the total private investment committed to infrastructure was US\$1.64 trillion globally and US\$472 billion for Asia and the Pacific (Figure 1). In that period the top recipient countries (in terms of value) in Asia were the PRC, India, Indonesia, Malaysia, and the Philippines. This important contribution is growing, as it is anticipated that the private sector will cover about 40% of the needed funding. To attract private sector, Asian economies need to develop appropriate policies, laws and regulations, and institutions for creating conducive business environment.



Figure 1. Trends in Public–Private Partnership Investment in Infrastructure, 1990–2008



Source: World Bank 2011

In addition to funding, attention must be paid to technology and efficiency in project implementation through private sector partnerships. PPP projects can be undertaken through various modalities depending on the levels of responsibility and risks assumed by the private operator. Box 2 defines the different types of PPP contracts.

Bond Based on Asian Infrastructure Currency Unit

The lengthy implementation of infrastructure projects exposes investors to exchange rate risks. This problem can be minimized through the creation of a bond based on an Asian infrastructure currency unit, consisting of a basket of currencies from major Asian and non-Asian advanced economies. An Asian infrastructure currency unit is simply an accounting mechanism equal to a weighted measure of Asian currencies and based on de facto relative stability between



Asian currencies. The weights of the currencies may be based on important factors such as GDP, international reserves, trade, among others.

Box 2. Different Types of Public–Private Partnership Contracts

- **Service contracts:** The public authority remains the primary provider of the infrastructure service, and contracts out only portions of its operation to the private partner. The contractor is paid a predetermined rate for labor and other anticipated operating costs.
- **Management contracts:** These contracts will help to expand services to be contracted out to the private partner to include some or all of the management and operation of public services. Similar to service contracts, the contractor is paid a predetermined rate for labor and other anticipated operating costs.
- **Affermage or lease contracts:** The private partner is entirely responsible for the service and assumes responsibility for quality and service standards. Initial establishment of the system is financed by the public sector and contracted to the private sector for operation and maintenance. A lease contract allows the private sector to retain revenue collected from customers and make a specified lease payment to the contracting authority, while an affermage contract allows the private sector to collect revenue from the customers, pay the contracting authority an affermage fee, and retain the remaining revenue.
- **Concessions:** The private sector operator or concessionaire is responsible for the full delivery of services in a specified area including operation, maintenance, collection, management, construction, rehabilitation of the system, and, most importantly, all capital investment. The concessionaire collects the user fee and the public sector role is only on regulating price and quality of service.



- **Build–operate–transfer and similar arrangements:** The private firm or consortium finances and develops a new infrastructure project or a major component according to performance standards set by the government. Moreover, the private partner provides capital to build and own the asset for a period sufficient to allow for cost recovery through user charges. At the end of the contract, the public sector assumes ownership but can opt to assume operating responsibility, contract operation responsibility to the developer, or award it to a new partner. Among the variations of build–operate–transfer is build–own–operate where the developer constructs and operates the facility without transferring ownership to the public sector.
- **Joint ventures:** The infrastructure is co-owned and operated by the public sector and private operators. They can either form a new company or assume joint ownership of an existing company through a sale of shares to one or several private investors. The company may also be listed on the stock exchange. The private partner assumes the operational role and a board of directors generally reflects the shareholding composition.
- **Hybrid arrangements:** Hybrid arrangements bring together the attributes most suitable to a particular project’s requirements and operating conditions. Hybrid arrangements provide a tailored solution in terms of scope and risk sharing that is most directly suitable to the project at hand. In some cases, the operator is given a limited investment responsibility, such as extension of network service coverage in certain areas. Alternatively, the operator and contracting authority may reach an agreement to cofinance investments.

Source: ADB 2008



6. Policy Issues

Addressing the financing problem of Asia's infrastructure—i.e., increasing the use of regional resources for Asian investment priorities and attracting investments from other parts of the world—requires innovative national and regional financing mechanisms as well as financial markets that are more developed, efficient, and integrated. By integrating the financial markets, Asian economies will be able to prevent outflow of funds and instead utilize the funds for regional and subregional infrastructure development. New national and regional institutions are needed, while some existing institutions should be strengthened to increase policy effectiveness, create more effective markets, promote infrastructure investments, and create a strong, integrated, and competitive financial system. While the public sector continues to play a major role in funding infrastructure investments, private sector participation will be increasingly important. Innovative and effective financing instruments, appropriate policies, laws and regulations, and institutions for conducive business environment with appropriate incentives for the private sector are required to encourage participation. At the same time, Asian economies need to develop bankable or commercially viable infrastructure projects by guaranteeing and minimizing key risks. It is important not only to increase the use of regional resources for Asian investment priorities but also to attract investments from other parts of the world such as Europe and the United States.



Lastly, support from multilateral and bilateral development institutions such as ADB, the World Bank, IDB and JICA must be increased by adopting new and innovative assistance strategies with greater emphasis on infrastructure investments.



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About this Policy Research Brief

In view of the huge infrastructure needs, as well as the reduced demand for exports due to the ongoing global financial and economic crisis, Asia needs to increase regional demand and intraregional trade by developing infrastructure for connectivity enhancement and economic integration. This policy brief proposes various ways to tap Asia's huge financial resources to fund essential infrastructure. The key challenges for financing include financial market integration so as to mobilize Asian savings for infrastructure across Asian countries, and providing proper incentives to investors, particularly those in the private sector, by developing appropriate policies, regulations, and institutions and long-term innovative financial instruments.

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ADBI carries out research and capacity building and training to help the people and governments of Asian and Pacific countries. ADBI aims to provide services with significant relevance to problems of development in these countries.



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