Prioritising Urban Infrastructure Projects in Asia

A framework for assessing investment impact

COLUMBIA | SIPA
School of International and Public Affairs

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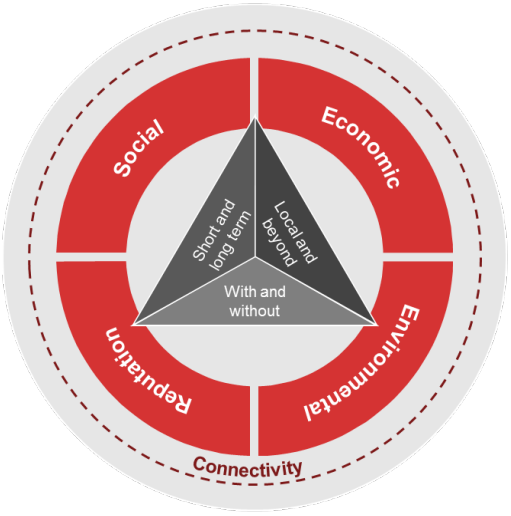
Executive Summary

The Asian Infrastructure Investment Bank (AIIB) engaged a team of graduate students from Columbia University's School of International and Public Affairs (SIPA) to develop a framework that prioritises urban infrastructure projects. Given the resource and time intensity of full-fledged cost-benefit analysis, we have developed and tested such a framework that assists AIIB to identify and prioritise projects for further detailed evaluation.

FRAMEWORK

The framework is designed to be lean and assesses a project's impact through four impact pillars: economic; social; environmental; and reputational—each consisting of a list of criteria that have been identified through research on prioritisation processes of relevant entities.



The Impact Framework

In developing the different criteria for each dimension, the team distinguishes three layers: core criteria, non-core criteria and strategic considerations.

- *Core criteria* are a set of criteria that can be assessed for all possible projects in a consistent manner given the typical availability of relevant data in Asian countries. A list of 20 core criteria across four dimensions has been proposed based on desk research and the insights gathered from field visit to Indonesia, Singapore and Vietnam.
- *Non-core criteria* are criteria that could be of relevance depending on the project, but might require additional data gathering efforts and/or statistical modelling. A list of 37 non-core criteria has been proposed that covers a wide range of urban infrastructure contexts. Non-core criteria can "graduate" to the core, depending on the proposed projects or by making additional data generation a requirement. Essentially, assessors have the flexibility to include as many non-core criteria as data availability allows.
- *Strategic considerations* are additional considerations of overarching strategic nature that might influence the chances of achieving the expected impact on the ground, and offer opportunity to discuss a range of policy choices. Strategic considerations are difficult to quantify, and depend on a complex set of assumptions.

Both core and non-core criteria can be measured in quantitative and/or qualitative manner; the former refers to numeric calculations and the latter to ranking the criteria on a scale of high-medium-low.

Lastly, the framework incorporates another evaluation layer labelled "connectivity." This multifaceted layer accounts for the special importance of connectivity for sustainable city infrastructure. Given that connectivity contains elements of all four impact dimensions, and that its effects are often difficult to quantify, a project's possible connectivity impact will not be added to its Prioritisation Indicator, but rather used to separately highlight specific projects within the portfolio, based on the three connectivity pillars proposed by ASEAN: physical; institutional; and people-to-people connectivity.

Dimension	Core Criteria
Economic	Direct job creation
	Number of direct beneficiaries
	Change in direct government net revenue
Social	Accessibility to social services
	Attitudes towards policy/project
	Evictions, demolitions and resettlements of people
	Liveability level
	Community and stakeholder engagement
	Access for women, youth, and the disabled
	The poor's access to human, social, financial, and natural assets
Environmental	Air pollution
	Greenhouse gas emissions
	Energy efficiency or green energy
	Contamination of land
	Vulnerability to climate change and other disasters
	Availability of (greenfield) land
	Water quality
Reputation	Position the city/country as a good place to live, visit, and invest
	Attract mega-events
	Create visual architecture or unique scenic-landscape

20 Core Criteria

Framework operationalisation. Operationalising the framework starts by rating each of the core criteria. The second step is to normalise each of the rating score adhering to normalisation rules. Third, each criterion score is multiplied with the assigned weight. For the purpose of operationalisation, the team assigned equal weight to all core criteria belonging to the same impact dimension and came up with the weighted average scores of economic, social, environmental, and reputation impacts for each project. However, the weighting system is not static and can be adapted to changing priorities and circumstances. After multiplying each criterion score with the assigned weight, each of the scores is aggregated to yield the final score of one project. The final step is to rank the final scores of multiple projects.

Dimension	Dimensional Weight	Core Criteria	Criteria Weight
Economic	1/4	Direct job creation	1/3
		Number of direct beneficiaries	1/3
		Change in direct government net revenue	1/3
Social	1/4	Accessibility to social services	1/7
		Attitudes towards policy/project	1/7
		Evictions, demolitions and resettlements of people	1/7
		Livability level	1/7
		Community and stakeholder engagement	1/7
		Access for women, youth, and the disabled	1/7
		The poor's access to human, social, financial, and natural assets	1/7
Environmental	1/4	Air pollution	1/7
		Greenhouse gas emissions	1/7
		Energy efficiency or green energy	1/7
		Contamination of land	1/7
		Vulnerability to climate change and other disasters	1/7
		Availability of (greenfield) land	1/7
		Water quality	1/7
Reputation	1/4	Position the city/country as a good place to live, visit, and invest	1/3
		Attract mega-events	1/3
		Create visual architecture or unique scenic-landscape	1/3

Prioritisation Framework Weighting Scheme

The framework in action. A simulation exercise was conducted to test the consistency and to identify limitations and areas of improvement for the framework. The team chose five ongoing or recently completed projects from three cities covering four sectors—transportation, energy, sanitation and slum upgrade—as follow:

- Indonesia Second Power Transmission Development Project
- Indonesia National Slum Upgrading Project
- Ho Chi Minh City Green Transportation Development Project
- Ho Chi Minh City Environmental Sanitation Project
- Bogor Urban Water Supply and Sanitation

The simulations suggest that the power transmission project in Jakarta has the greatest impact in terms of beneficiaries and stimulating electricity consumption. The green transport project in Ho Chi Minh City is more environmentally friendly relative to the other projects because it eases traffic congestion, encourages citizens to adopt an environment-friendly way for commuting, and results in improvements to air quality. The two sanitation projects in Ho Chi Minh City and Bogor, though implemented in two different types of cities, have relatively higher social impact compared to other dimensions. This can be explained by the improved health prospects due to the project's participatory engagement approach, and the distribution of social benefits to communities.

In summary, the team observed two general patterns from the simulation results. While generalisations based on our small sample are hazardous, for what they are worth, the following emerge from our exercise. First, while projects in different sectors displayed a variety of outcomes alongside the impact dimension, projects in the same sector appeared to have similar scores at least in the most relevant dimensions as shown by the very similar score characteristics of two projects, the Ho Chi Minh City Environmental Sanitation Project and Bogor Urban Water Supply and Sanitation Project. Second, the type or size of the city did not dictate dimensional impact.

	Jakarta Second Power Transmission Development Project	Jakarta National Slum Upgrading Project	HCMC Green Transport Development	HCMC Environmental Sanitation Project	Bogor Urban Water Supply and Sanitation Project
Economic	0.60	0.13	0.32	0.18	0.35
Social	0.49	0.57	0.37	0.61	0.79
Environmental	-0.03	-0.07	0.16	0.06	0.11
Reputational	0.27	0.17	0.67	0.60	0.27
Average Score	0.33	0.20	0.38	0.36	0.38
Strategic Consideration	Energy connectivity	City rejuvenation; Institutional dissemination	Sustainable growth; Smart city integration,	Sustainable disposal of water; Urban rejuvenation	Sustainable utility capacity building (PDAM)

Summary of Mock-Up Results

Limitations. At the conceptual level, our prioritisation framework tried to reconcile several and potentially competing development goals such as promoting growth, enhancing sustainability, increasing connectivity, reducing inequality and protecting the environment. Despite trying to approach prioritisation in a systematic and objective manner; strategic, discretionary guidance and direction plays a significant role in determining relative importance of one objective over another.

At the operational level, the refinement of the framework through trimming down and simplifying a number of criteria was the result of a lack of available data and complexity in data collection and modelling. There are two limitations identified related to data availability. First, even when there exists global database or global indices on a certain indicator, they do not guarantee that same data will be available on a city level. Second, there is cross-sector data inconsistency or variability with regard to the same data

The second limitation at the operational level refers to the issue of aggregation. In its current form, each criterion captures different aspects of a project forming, a decision matrix to compare and rank projects based on its impact. The framework gives room for strategic leverage through the modification of rating and weighting systems.

CASE STUDIES

The case studies provided a closer look at the infrastructure landscape for each city visited as part of the team's field research. While the team consulted a range of infrastructure stakeholders on the implementability of the framework, these meetings also provided insights on the unique challenges, decision-making processes, and regulations for each city. The cities chosen represented three broad categories –megacity, second-tier city, and smaller urban centres– to better reflect the unique urban infrastructure challenges that each of these categories of cities face. The highlights from the field research are as follows:

- In *Jakarta*, a structured national infrastructure prioritisation effort exists and is largely driven by the government's wish to accelerate infrastructure delivery. While aiming to be technocratic, political considerations inevitably affect the process. In addition, AIIB might want to look into advancing the smart city concept in Jakarta—a cross-cutting solution that aligns with regional initiative but not fully-tapped by anyone yet.

- For *Ho Chi Minh City*, the team found that Vietnam's infrastructure prioritisation decisions are guided by an economy-focused strategy developed by the Ministry of Planning and Investment and approved by the People's Committee and the Prime Minister. However, there is a disconnect in the implementation phase since actual infrastructure developments in Ho Chi Minh City often depart from the central master plan.

- The *Bogor* city government has a clear vision to develop a sustainable city but has been constrained by both budgetary limitations and technical capabilities. In analysing Bogor's "Smart and Sustainable City Policy", the team observed that the local government has sufficient capacity to plan both overarching and sectoral strategies and is on the right path towards carving the necessary foundations. External loans and investments will further Bogor's low carbon development trajectory.

- *Singapore* was selected to provide a benchmark to compare and contrast that city's best practices in urban infrastructure development and governance against those of Bogor, Jakarta and Ho Chi Minh City. According to various studies on global infrastructure, Singapore leads in terms of infrastructure stock and quality. Its key defining features are its technocratic government's capability in drafting and executing long-term master plans, consultation with infrastructure experts, and strong public governance that prevents national interests to be undermined by political forces.

Introduction

Why prioritise urban infrastructure projects in Asia?

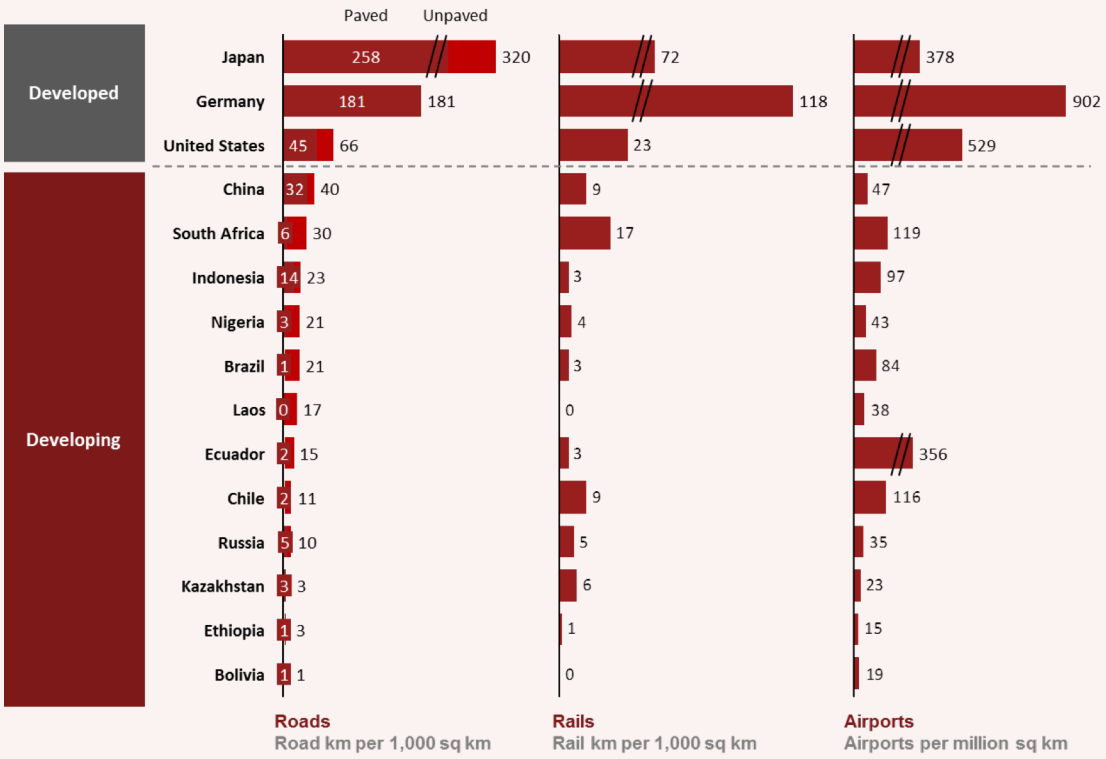
BRIDGING THE INFRASTRUCTURE GAPS

Global infrastructure gaps have widened

At present, there exists a significant gulf between the need and delivery of urban infrastructure across the globe—one such measure is an estimate by McKinsey & Co. that USD 57 trillion in infrastructure investment is needed to keep pace with global GDP growth from 2013 to 2030 (Dobbs et al. 2013). The role that urban infrastructure plays in driving sustainable economic growth and social-development cannot be understated and is illustrated by the significant disparity in network connectivity between developed and developing countries (see Box 1). A robust transport-connectivity network, for example, is a key economic driver as it advances efficient movement of people and expedient shipment of goods. The impact that infrastructure has on economic growth is well recognised in the developing world, which is reflected by the proportional increase in infrastructure spending against GDP for many of these countries.

Box 1

NETWORK DENSITY BETWEEN DEVELOPED AND DEVELOPING COUNTRIES, 2012



Source: McKinsey & Company

Financing challenges and alternative financing sources

Both developing and industrialised countries face infrastructure demands albeit in different contexts. Developing countries face an enormous deficit in the quantity of infrastructure stock while industrialised countries, with well-provisioned infrastructure stock, are mainly plagued by underperforming infrastructures that hinder productivity. Urban infrastructure development projects are typically capital intensive and require significant budgetary allocation for completion; however, when comparing developing to industrialised countries, the latter is better positioned to independently finance infrastructure projects due to their more sizeable national budget.

As developing countries grapple with fiscal realities, infrastructure investment projects are often put off since they are among the few discretionary items that governments can cut without facing strong immediate stakeholder opposition. While this phenomenon runs contrary to the widely held understanding that urban infrastructure raises productivity and growth, decision-making is often marred by political interests or expediency. Since the benefits of urban infrastructure can only be realised in the mid to long-term horizon, governments are more inclined to allocate budgets to projects and initiatives that allow them to extract the most political mileage in the short-term that prolongs their longevity in public office.

Governments typically face difficulty in raising capital since the variety of fund raising mechanisms that governments can employ have become increasingly limited. Following the 2008 global recession as regulatory bodies tightened regulations on financial institutions that leave them with less manoeuvrability in their investment decisions. As developing countries face fiscal pressures and limitations to fund raising mechanisms, alternative financing sources play a vital role in addressing the shortfall between infrastructure financing needs and available public capital.

PRIORITISING TO MEET THE CHALLENGE

Financing demands outstrip resources

With regard to urban infrastructure projects, funding from multilateral development banks (MDBs) forms a significant portion and is widely preferred due to better terms offered. In addition, MDBs are often regarded as a preferred partner due to their technical knowledge and are driven by institution goals that are commonly aligned to the national interests—green economic growth, poverty reduction, and others. However, the capacities of MDBs are limited by the supply of funds at their disposal as well as the borrowing limitations of client countries. This necessitates an urban infrastructure investment prioritisation framework to effectively determine which projects should their funds be directed to that generate the greatest marginal impact for target beneficiaries, best aligned to institutional vision, and that achieve desired and specific outcomes. For the newly established AIIB, it might be an advantageous position to formulate a prioritisation framework less burdened by the legacy that longer established MDBs face.

Since AIIB was founded in 2015, the bank has primarily used co-financing partnerships with other MDBs such as the World Bank and ADB. As AIIB prepares to undertake its own exclusive projects it is seeking to develop its own prioritisation framework. A team of graduate students from

Columbia University's School of International and Public Affairs (SIPA) has been assigned to assist in this exercise. The SIPA team reviewed various prioritisation frameworks used by other MDBs and recommendations made by consulting agencies. Following the literature review, the team proceed to develop a preliminary framework that aims to encapsulate the best practices used by each organisation. To test and gain feedback on the implementability of the framework, an in-country consultation with local urban infrastructure stakeholders was conducted.

The prioritisation framework developed by the team assesses impact of multiple projects across four impact pillars: economic; social; environment; and reputation. The framework also enables the assessment projects from different sectors, which reflect the variety of incoming financing proposals AIIB is expected to receive. Apart from assessing impact, the framework incorporates an evaluation layer described as *strategic considerations*, which broadens the picture and allow for incorporating other considerations and criteria. The strategic considerations fundamentally revolve around sustainability – a much talked about area of interest that governments today are increasingly interested in. The issues and discussions on sustainability have been highly complex and multifaceted which has resulted in an absence of a clear definition of sustainability. However, while the SIPA team identified four areas relevant to sustainability: (1) intra and inter-regional connectivity; (2) economic enablers; (3) environmental impacts; and (4) sectoral synergy. The team chose to focus on connectivity since it has a clearer definition and enables the team to more accurately assess its impact in comparison to other areas of sustainability.

Box 2

HOW DOES SINGAPORE DO IT?

MOVING AWAY FROM PROJECT IMPACT TO NATIONAL OBJECTIVES

Singapore's is reviewing its evaluation by assessing projects based on their impact to national interests: (1) strategic economic enablers; (2) anticipated population growth demands; (3) ensuring liveability; (4) future land use & environment; (5) infrastructure rejuvenation & maintenance.

Hitherto, project evaluations done by other MDBs appear to focus on traditional areas of impact and place lesser emphasis on strategic considerations. By incorporating strategic considerations into AIIB's evaluation criteria, AIIB may be able to establish a clearer institutional identity and also influence governments to take a stronger stance on sustainability - during our field studies, interviewees have remarked that AIIB should distinguish itself from the other MDBs. In addition, by incorporating strategic considerations into AIIB's project evaluation process, it is expected that the bank will be more inclined to fund future infrastructure projects that can effectively address future sustainability challenges of population demands and climate change in the long-term horizon. This encourages governments seeking infrastructure funding from AIIB to take a stronger stance in considering sustainability factors in its future master plans and infrastructure projects.

METHODOLOGY

Selection process for case studies

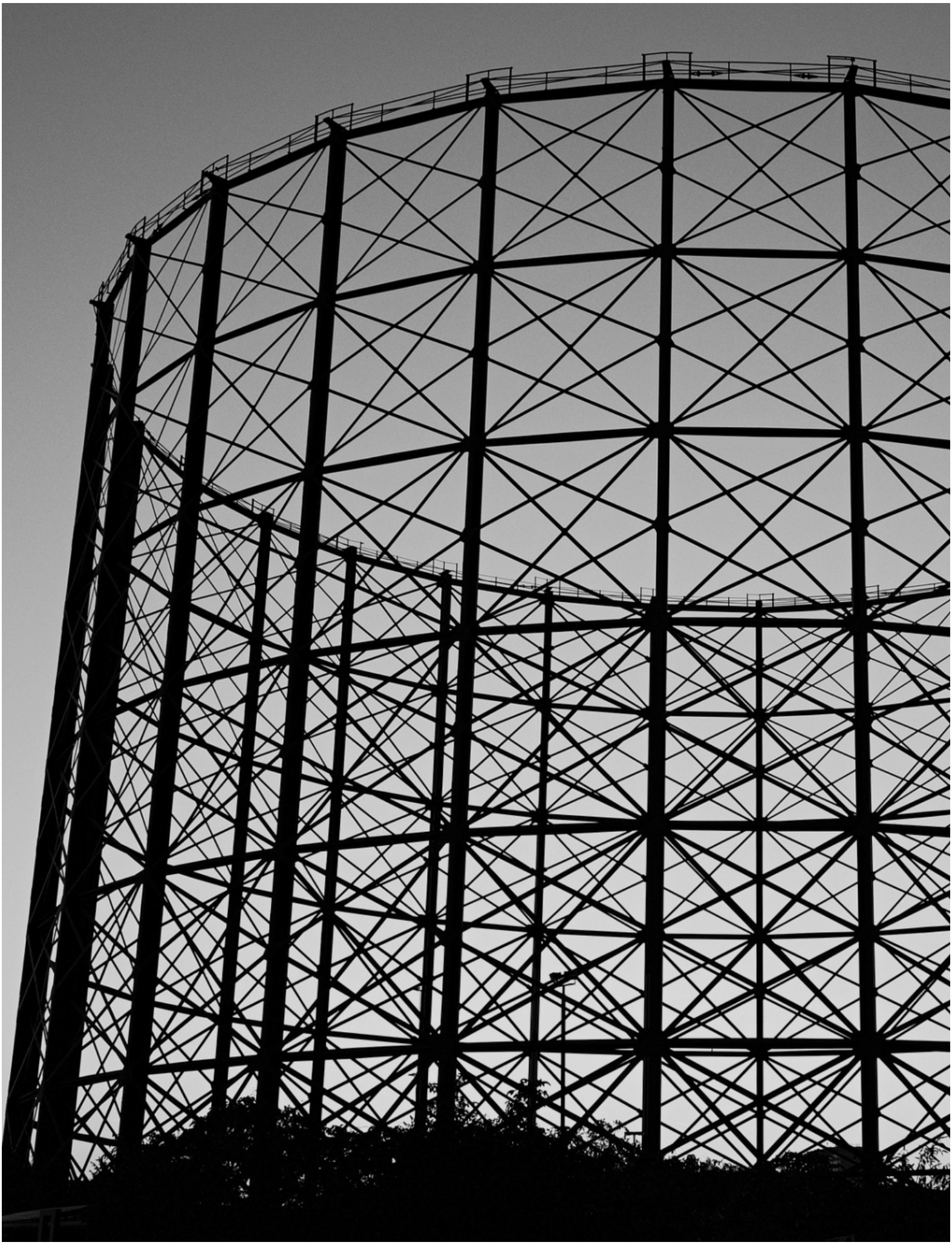
The city-selection process for the case studies began with a review of regions that are of relevance to AIIB. At the recommendation of the research team and concurrence of AIIB officials, Southeast Asia was identified as the region of focus for its high economic growth potential and demonstrated commitment to infrastructure investments by Southeast Asian governments as a whole. Some notable developments in Southeast Asian infrastructure landscape are as follows: (1) The Philippine President Rodrigo Duterte has promised over USD 160 billion towards infrastructure development over his six-year term; (2) Thailand plans to list an infrastructure fund

on the its stock exchange; (3) Indonesian President Jokowi announced the goal to increase infrastructure spending by 10% year-on-year; and (4) development of a high-speed rail between Singapore and Malaysia that enhances connectivity between both countries. Upon further consultation with AIIB, the team selected Vietnam and Indonesia for differing motivations. Vietnam's demographically young and increasingly educated population presented a positive outlook for Vietnam in the mid-term horizon. If infrastructure developments were to ramp up and keep pace with expected growth, the country would witness rapid growth that befits its potential. With ASEAN's largest economy and population, Indonesia's economic growth is impeded by a significant inadequacy in infrastructure. The stress on infrastructure is further exacerbated by large migrations from the less-commercially developed centres to cities where a higher concentration of better-paying jobs and career opportunities exists.

The selection of specific cities in Vietnam and Indonesia was completed after review of city membership in the C40 Cities and 100 Resilient Cities consortiums. AIIB and the SIPA team agreed that a commitment to climate change protection was a critical decision factor since cities in the future will play an important role tackling the growing challenges that climate change presents. Three cities were selected based on their population size to more accurately reflect the infrastructure demands and local economic realities that each city type faces. Jakarta was selected to represent the challenges faced by mega-cities given its stupendous infrastructure challenge due to over-crowding. For second-tier cities, Ho Chi Minh City was identified since the government has been developing infrastructure developments that better mitigate the challenges faced by megacities. To represent smaller urban centres, Bogor was deemed as a suitable case study due to its close proximity to the capital and the fact that is has seen an increase in investments. As Jakarta continues to face challenges reconciling infrastructure availability and needs, we expect more business to shift to periphery cities such as Bogor.

In order to have a stronger understanding of best practices in urban infrastructure planning within the region, the team looked towards Singapore—a country that stands out due to its high levels of infrastructure stock and quality. In an infrastructure study conducted by Mercer (2017), it ranked first in the world for infrastructure. The country has also done well in achieving remarkable results in sustainability. In a 2016 report on Sustainable Cities by consulting firm Arcadis, Singapore was ranked 1st in Asia and 2nd in for sustainability. The report cited that although the city-state faces an aging population and increasing need for greater investment in social infrastructure, the government has taken a focused approach in crafting policies that anticipate these challenges early on (Arcadis 2016). Two examples are the government's ambitious goal of having 80% of all buildings in the country to be classified as "green" by 2030 and its investment in resiliency by making plans for a Deep Tunnel Sewerage System that will be a super-highway for treatment and disposal of used water (Singapore International Water Week 2017).

Singapore's urban infrastructure capabilities enabled the government to effectively drive the economy forward at impressive speeds and have contributed to a high quality of life for its people. The SIPA team aims to incorporate key learning points from the Singapore experience into its framework and also provide a contrast to how Indonesia and Vietnam conducts its urban infrastructure planning and overall strategies.



The Conceptual Framework

The framework concept and its development process

Prioritising infrastructure projects involves evaluating a number of diverse projects from different cities and at different stages of economic development. Without rigorous methodology and well-defined boundaries, this can be an extremely difficult and time-consuming effort. The framework proffered here had been developed to address the aforementioned challenges by taking expected *impact* as the basis for the prioritisation effort. There exist numerous perspectives toward prioritisation; some might prioritise using financial metrics while others believe implementability of the project serves as the best measure. This report does not propose which approach is the most optimal one—it may well be that all approaches are complementary and should be combined. Instead, this report introduces a framework that effectively and efficiently prioritises various infrastructure projects by solely evaluating *impact*.

Components of the framework

The framework is represented by a circular diagram (see Box 3, "The Impact Framework") that depicts the relationship of four impact-based prioritisation components:

- the strategic direction of the user of the framework (i.e. AIIB);
- the four constituents that define impact—and their respective criteria;
- the three lenses to view impact; and
- *connectivity* as an all-encompassing impact multiplier

This section provides definitions of the four components and explains how they interact with each other. Furthermore, to reflect the framework's evolution and refinement process, critical feedbacks from experts and stakeholders as results of consultation in Indonesia (Jakarta and Bogor), Vietnam (Hanoi and Ho Chi Minh City), and Singapore are also provided.

AIIB'S STRATEGIC DIRECTION

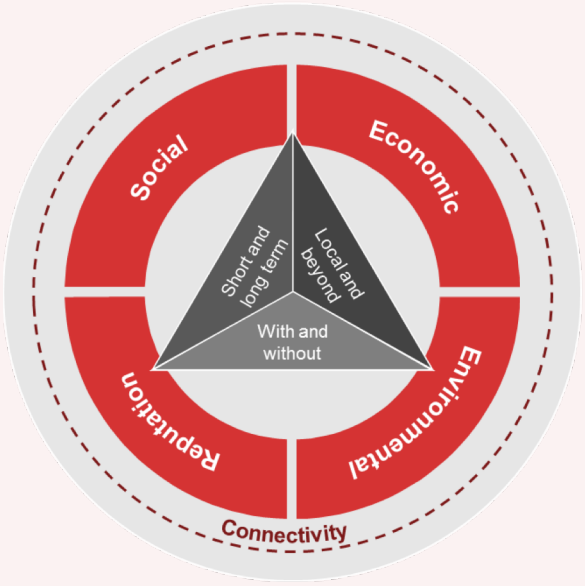
The framework is created for AIIB and thus inherits the Bank's strategic direction and modus operandi. Tangibly, this means that the framework can be actively shaped by AIIB, for instance by assigning greater weight to issues that matter for AIIB, or by incorporating additional core criteria based on AIIB's project portfolio. For example, to apply the bank's *green* principle, AIIB is given the space to give equal or even greater weight for environmental impact.

FOUR IMPACT COMPONENTS

Infrastructure contributes to development in different ways. Subscribing to this idea, the framework classifies impact by its four constituents: economic; social; environmental; and reputation—in which every project must be assessed against them.

Box 3

THE IMPACT FRAMEWORK



Impact Framework

Four Impact Components
In assessing impact of an infrastructure project, the framework looks into four aspects: economic, social, environment, and reputation—all for the betterment of the city.

Three Lenses
While assessing, the framework take three perspectives: the impact in short & long term; the impact for local & beyond scoped area; the impact with & without the project.

AIIB Strategic Direction
All the assessment should reflect AIIB strategy and *modus operandi*. The framework allows space to weigh what matters for AIIB, e.g. AIIB's 'green' principle, is fully reflected through the framework's mechanisms.

Connectivity
This layer accounts for the special importance of connectivity for sustainable city infrastructure, and encompasses *physical* (transport, ICT, energy), *institutional* (trade, investment, services), and *people-to-people* (education, culture, tourism) connectivity

- **Economic.** This component looks for the impact towards the economy. It includes how urban infrastructure projects brings economic benefits to community and the government, how it propels business creation, induces efficiency gain, and acts as an economic enabler.

- **Social.** This component assesses the way an urban infrastructure project generates social returns and alters social order in the affected communities. It includes population characteristics, social capital, inclusion, access and connectivity, and health and safety issues.

- **Environmental.** The environmental impact component is a rather extensive yet important aspect that looks into energy, greenhouse gases and other emissions to air, resilience, land and habitat, urbanisation, water resources and water environment.

- **Reputation.** While it is common to define economic, social, and environmental impacts, this framework adds another important constituent that is reputation. This component identifies a shift in reputation both internally (e.g. pride of its citizen) and externally (i.e. how it is perceived by non-citizens and the international world). Unconventional as it seems, there have been situations in which a city government invests in certain infrastructure projects to elevate the city's image. The city of Aberdeen, for instance, explicitly states "a better image for Aberdeen" as its goal and invests in infrastructure projects such as regeneration of the city centre or development of a historical square (Aberdeen City Council 2016). In our interview the idea of including reputation impact was welcomed. Most interviewees see it as interesting and good to be included. An interviewee from a local government association, for instance, spoke about the importance of culture to a city. Cities all over the world are starting to take urban branding seriously. Non-physical elements such as culture and heritage have been with the city ever since, and infrastructure can be used to showcase those intangibles. Consequently, this will build the city's image and attract tourists and businesses. All of these considerations are included under the framework's reputation impact component.

Dimension	Core Criteria
Economic	Direct job creation
	Number of direct beneficiaries
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	Water quality
Reputation	Position the city/country as a good place to live, visit, and invest
	Attract mega-events
	Create visual architecture or unique scenic-landscape

Exhibit 1. *20 Core Criteria*

Nevertheless, one caveat is that this component must be treated carefully as not to be used to justify "white elephant" or "highway-to-nowhere" projects. It must be understood that reputation impacts shall only include those with real changes towards the image of the city.

Two layers of analysis

In developing different criteria within each dimension, the team distinguishes three layers of analysis: core criteria; non-core criteria; and strategic considerations.

Core criteria are a set of criteria that can be assessed for all possible projects in a consistent manner, given overall resource and time constraints. A list of 20 core criteria across four dimensions have been proposed and they have been identified based on desk research and our fieldwork insights from Indonesia, Singapore and Vietnam (see Exhibit 1). Rating and aggregation of core criteria yields a unique *Prioritisation Indicator* for each project. A more detailed description on the core criteria is given in Appendix A.

Non-core criteria are additional criteria that could be of relevance depending on the project, but might require additional data gathering efforts and/or statistical modelling. A list of 37 non-core criteria has been proposed, covering wide range of topics and contexts. Non-core criteria can

"graduate" to the core, depending on the sophistication of proposed projects or by making additional data generation a requirement for project applicants See Appendix B for list of non-core criteria and example how one can "graduate" to core list. Both core and non-core can be measured in quantitative and/or qualitative manner; quantitative as in based on numeric calculations and qualitative as in scaling between high-medium-low. Qualitative criteria can also be based on expert judgment.

The process of identifying core versus non-core criteria is not merely a technocratic decision but rather an opportunity to set strategic priorities when comparing different projects. The result of the prioritisation exercise is a living document that can change depending on the project portfolio. The decision-making process for core versus non-core criteria is based on the following:

- *Data availability.* The greater the data availability is, the more likely a criterion is categorised as core. The judgment is also highly contingent on the data gathering method, i.e. whether a criterion is measured based on baseline data or requires further statistical modelling. Baseline refers to measurements of key conditions (indicators) before a project begins, from which change and progress can be assessed (IFRC 2013). Baseline or basic data are usually obtained from different agencies within government such as local municipalities, statistics bureaus, planning agencies; global database/rankings; international organisations; think tanks; and private entities. The current assessment of data availability is based on experiences from the team's country case studies.

- *Cross-project applicability.* Criteria that are applicable to most or all are categorised as core. The decision is influenced by the type of infrastructure project and the type of cities.

- *Relevance.* Criteria with medium to high relevance will be categorised as core and those that are relevant only to some project types will be categorised as non-core. The current assessment is based on a very narrow idea of relevance, to account for limited resources and to focus the analysis on the most relevant criteria.

Strategic considerations. This third layer consist of additional considerations of overarching strategic nature that might influence the chances of achieving the expected impact on the ground, or offer space to discuss multiple policy choices. Strategic considerations are difficult to quantify, and depend on a complex set of assumptions. We propose to collect them in a separate list, so that they can help interpret the Prioritisation Indicator results for different projects.

THREE LENSES

Another crucial aspect defined by the framework relates to the perspectives one should take when assessing impacts. The framework suggests seeing impact through three different lenses.

- **Short and long term**. This is important as some infrastructure projects may be delivered in phases, with some acting as enabler for subsequent developments. In such cases, the immediate impact might be small, yet its enabling feature is huge.

- **Local and beyond.** Second is on spatial scope of impact: whether the impact is localised (e.g. to the immediate catchment area) or beyond.

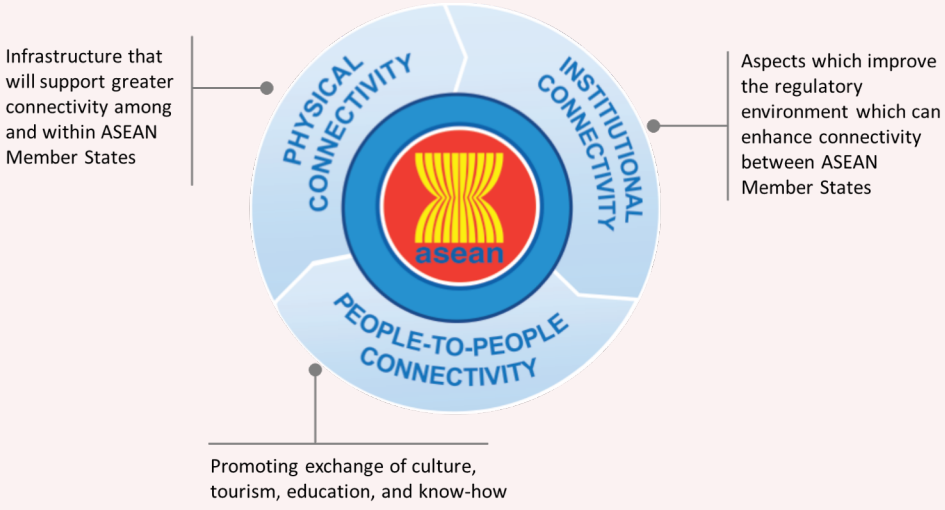
- **With and without.** Third is regarding the project's purpose, thus looking at the impact with and without the infrastructure. As our interviewee, who is a management consultant specialising in infrastructure practice based in Jakarta put it in one of the initial interviews, in the context of Jakarta and ASEAN cities, it is not only the impact of doing a project that needs to be observed, but also the impact and risk of not doing it.

CONNECTIVITY

This all-encompassing layer accounts for the special importance of connectivity for sustainable city infrastructure, as stressed by initiatives such as the Brookings Institution's Global Cities Initiative (Clark & Moonen 2013, Leal Trujillo & Parilla 2016), and several of the team's interview partners in the field. Connectivity also constitutes a key priority of the ASEAN Community for achieving its Vision 2025 (ASEAN 2016). For them, enhanced connectivity is essential "because a well-connected ASEAN, from its transportation networks to its peoples, will contribute towards a more competitive and resilient ASEAN", and ensure "continued peace and prosperity for its peoples" (ASEAN Secretariat 2011). ASEAN defines connectivity as the physical, institutional, and people-to-people linkages that can contribute towards a more competitive, inclusive, and cohesive ASEAN (see Box 4).

Box 4

ASEAN CONNECTIVITY 2025



Source: Master Plan on ASEAN Connectivity 2025

According to the first Master Plan on Connectivity from 2010, physical connectivity relates to the challenges that the region is facing with regard to the poor quality of roads and incomplete road

networks, missing railway links, inadequate maritime and port infrastructure including dry ports, inland waterways and aviation facilities, the widening of the digital divide, and the growing demand for power (ASEAN Secretariat 2011). Institutional connectivity is related to issues of trade, investment and services liberalisation and facilitation. People-to-people connectivity refers to education, culture, and tourism in the region. Given that connectivity contains elements of all four impact dimensions—economic, social, environmental and reputation—and that its effects often are more difficult to quantify, a project's possible connectivity impact will not be added to its Prioritisation Indicator, but rather used to separately highlight specific projects within the portfolio, based on the three connectivity pillars proposed by ASEAN.

The framework's mechanism

RATING AND SCORING

Within our framework, we incorporate columns on potential rating systems, how to measure them, along with the measurement index. The potential rating system elaborates on ideas to measure indicators, for example whether a criterion is measured by a specific ratio, an average, or qualitative expert judgment. For example, to measure one of the economic indicators, "Direct job creation", one needs to measure the absolute scale of jobs created per USD 100,000 investment during operation and maintenance phase.

The rating system elaborates on the calculation method or rating based on expert judgment. The quantitative rating system on the "Greenhouse gas emissions" indicator for instance calculates the percentage of total national contribution with the following calculation method: (GHG emission reduction achieved by project)/ (total intended nationally determined contribution); Rating 0-100%.

All criteria have an assigned direction of effect; some have one either up or down and some have both. In other words, the impact of a certain criterion can be positive or negative. Some criteria have 0-100% quantitative rating or 1-5 qualitative rating. If the criterion has no impact on the project, then the score is "0". Each of the criteria's score is then normalised within the range of "-

Box 5

CAVEATS ON NORMALISATION

Below are some caveats on normalisation:

- **Quantitative normalisation:** 2%, 33%, 66% $\Rightarrow$ 0.02, 0.33, 0.66
- **Qualitative normalisation**
  - With positive direction of effect: 1, 2, 3, 4, 5 $\Rightarrow$ 0.2, 0.4, 0.6, 0.8, 1
  - With positive & negative direction of effect: -3, -2, -1, 0 , 1, 2, 3 $\Rightarrow$ -1, -0.66, -0.33, 0, 0.33, 0.66, 1
- **Normalisation operationalisation**

  The environmental criterion "Vulnerability to climate change and other disasters" is rated based on expert judgment between a scale of 1 to 5; "1" indicating low-risk and "5" indicating extremely high-risk. If the expert rates the project as medium-risk, the score will be "3" and the normalised score will be "0.6".

1" and "1" (see Box 5). Lastly, we do not assign a quantitative or qualitative scoring system to the strategic considerations section because, as previously mentioned, this part of the framework aims to provide additional layers of interpretation for the Prioritisation Indicator results of different projects.

OPERATIONALISING THE FRAMEWORK

The process of operationalising the framework starts by rating each of the 20 core criteria. The second step is to normalise each of the rating score adhering to normalisation rules. Third, each criterion score is multiplied with the assigned weight. For the purpose of operationalisation, the team assigned equal weight to all core criteria belonging to the same impact dimension and came up with the weighted average scores of economic, social, environmental, and reputation impacts for each project. With four dimensions in total, each dimension is weighted one-fourth. Each criterion under one dimension is weighted equally which means the final weight of each criterion under one dimension differs from criterion of another dimension i.e. one economic criterion weighs 1/12 meanwhile one social criterion weighs 1/28. The team gives equal weight to each criterion and to each dimension for practicability reason. However, the weighting system is not static and can be adapted to changing policy priorities and circumstances. After multiplying each criterion score with the assigned weight, each of the scores is aggregated to yield the final score of one project. The final step is to rank the final scores of multiple projects.

Our framework allows the flexibility of two policy choices. First is the selection of core and non-core criteria depending on project type and relevance. Second is the weightage of each dimension and criterion.

Exhibit 2. *Prioritisation Framework Weighting Scheme*

Dimension	Dimensional Weight	Core Criteria	Criteria Weight
Economic	1/4	Direct job creation	1/3
		Number of direct beneficiaries	1/3
		Change in direct government net revenue	1/3
Social	1/4	Accessibility to social services	1/7
		Attitudes towards policy/project	1/7
		Evictions, demolitions and resettlements of people	1/7
		Livability level	1/7
		Community and stakeholder engagement	1/7
		Access for women, youth, and the disabled	1/7
		The poor's access to human, social, financial, and natural assets	1/7
Environmental	1/4	Air pollution	1/7
		Greenhouse gas emissions	1/7
		Energy efficiency or green energy	1/7
		Contamination of land	1/7
		Vulnerability to climate change and other disasters	1/7
		Availability of (greenfield) land	1/7
		Water quality	1/7
Reputation	1/4	Position the city/country as a good place to live, visit, and invest	1/3
		Attract mega-events	1/3
		Create visual architecture or unique scenic-landscape	1/3

LIMITATIONS

At the strategic level, our prioritisation framework tried to reconcile several and potentially competing development goals such as promoting growth, enhancing sustainability, increasing connectivity, reducing inequality and protecting the environment. Despite trying to approach prioritisation in a systematic and objective manner, strategic guidance and direction plays a significant role in determining relative importance of on objective over another.

At the operational level, the framework refinement through trimming down and simplifying a number of criteria was the result of finding a lack of available data and complexity in data collection and modelling. There are two limitations identified related to data availability. First, even when there exist global database or global indices on a certain indicator, they do not guarantee that same data will be available on a city level. Second, cross-sector data inconsistency or variability with regard to the same data yields inconsistency. Our field visit to Indonesia taught us that even when certain data is available on national level, it does not guarantee singularity and consistency of the data. More often than not, certain data has multiple owners with high variability on content. For instance, there are inconsistencies between different economic sectors data (real sector, external sector, government sector and financial institutions sector); basic population data (poverty, net enrolment, temporary and non-temporary migrants) and so on. Unavailability of more advanced date made us having to revert to more basic data and this precipitates trade-off towards comprehensiveness and inclusiveness of project's potential impacts. Complexity in data collection and modelling also hindered us from having more advanced indicators that require more sophisticated data collection and processing.

The second limitation at the operational level refers to the issue of aggregation. In its current form, each criterion captures different aspects of a project forming a decision metrics to compare and rank projects based on its impact generation. The framework gives room for strategic leverage through the modification of rating and weighting systems.

The SIPA team anticipates that AIIB could face similar limitations that the team has experienced in its fieldwork. As a result, our framework has been refined using simpler criteria that do not include complex model testing, but criteria that are easily evaluated.

The proposed framework could be expanded by AIIB to include the non-core criteria or any additional criteria that require complex modelling measurements for evaluation. In view of the time and resource constraints faced by the SIPA team, the current framework only includes criteria where data is readily available.

Case Studies

A closer look at Jakarta, Bogor, and Ho Chi Minh City's infrastructure scene

Indonesia: acceleration in delivery

Indonesia ranks 62nd out of 140 countries in 2015 WEF global infrastructure quality. Yet, the ASEAN's largest economy is near the bottom when compared with its regional peers (WEF 2015). Following the Asian financial crisis, Indonesia's investment in infrastructure plummeted from nine percent of GDP in 1990s to only two percent of GDP in 2001. Slight recovery took place in 2014—reaching four percent of GDP—yet this figure is still far below the investments made by other Asian high-growth economies, which invested six to seven percent of their GDP in infrastructure (OECD 2015). Anyone visiting the country, leave alone residents, would easily agree that infrastructure is an issue. Prima facie, one could point out the infamous road congestion in Jakarta. As the country grows and urbanisation ensues, it is likely that demand for infrastructure will continue to trail its current path. At present, lack of quality in infrastructure has inhibited Indonesia's growth. But more importantly, a considerable number of Indonesians are living without sufficient access to basic facilities. Thus, Indonesia needs to ramp up infrastructure development, not only to unleash its economic potential but also to serve its people better.

Huge need and constrained government budget

Infrastructure has dimensions of being a public good, hence a significant amount of its financing comes from government budget. Yet infrastructure spending was constantly crowded out in the past: on average, only 10% of government budget was allocated for infrastructure development between 2010-14, compared to 19% for energy subsidies (Deutsche Bank 2016). However, the current administration has shown its commitment to push infrastructure development forward. Through infrastructure, the government is aiming to reduce logistics costs from 27% to 19% of GDP and to reach electrification ratio of 96.6% by 2019 (Kannan 2015). This ambitious plan is accompanied by policy reforms and budget increase. A constant increase of eight to nine percent YoY for public spending on roads, railway, and airports is expected to continue (Deutsche Bank 2016). Moreover, such commitment is also supported by structural changes. As DBS (2015) pointed out, the three most visible policy reforms are:

- **Reallocating fuel subsidy budget to infrastructure.** In 2015, Indonesia removed gasoline subsidy and fixed diesel fuel subsidy to IDR 1,000 per litre—saving around USD 1.5 billion annually, in which much of them can be rechannelled for infrastructure development.

- **Revising policies to speed up land acquisition.** The new bills (Law Nr. 2/2012 & Presidential Regulation Nr. 71/2012) provide better clarity on land acquisition timeline for public projects, limiting land acquisition procedure to 583 days and allowing revocation of land rights for public interest. There are weaknesses, yet this direction is highly appreciated by the market.

- **Injecting capital into infrastructure-related State-Owned Enterprises (SOEs).** Realising that the fastest way to boost infrastructure is by adding capital to infrastructure SOEs, the government injected IDR 95.4 trillion (USD 7.2 billion) through equity between 2015-16.

However, despite such commitment, gap in financing is still an issue in realising such aggressive targets. BAPPENAS[1] in its 2015-19 development plan estimated that around IDR 5,519 trillion (USD 400 billion) is required to finance infrastructure projects, yet only half of the total will come from state and provincial budget (see Appendix C), emphasising the need for alternative scheme (Saragih 2015). Moreover, this issue is further clouded by the fear of weak government revenue outturns, as it was the case during the first half of 2015 (Deutsche Bank 2016). Nevertheless, Indonesia's strong economic outlook combined with accelerated reform is expected to further encourage higher domestic and foreign private investments. This is indeed positive for the sector, and in fact, positive inflow of Foreign Direct Investment (FDI) seems to be the trend. For infrastructure-related sectors, PwC (2016) reported that FDI grew by 9.6% to USD 11.3 billion in 2015, with utility sector as major beneficiaries of this increase.

Alternative source of financing: focus on the role of DFIs

Private financing may come in different types: loans by commercial banks, project financing, equity financing, funds, and bonds. While local institutional investors traditionally had limited role in infrastructure, Development Finance Institutions (DFIs) operating in Asia, such as the World Bank or ADB have long kept their focus on infrastructure development. In this regard, it is expected that DFIs will continue to play their important functions in infrastructure sector in Indonesia, and doing so through three avenues: **(1) making available of the capital for development** (see Appendix D for loan commitment by various DFIs to Indonesia in 2015-19); **(2) providing technical assistance**, such as to improve capital mobilisation, set up monitoring and risk assessment frameworks, and help establish capital market deepening to support investment; and **(3) providing credit enhancement schemes** to ensure smoother funding for risky projects.

However, although the commitments are promising, disbursements remain a huge issue. Kannan (2015) identified two sources of issues: first is regarding **project implementation bottlenecks.** Funds committed to projects may not be disbursed on time as projects are troubled in meeting its own milestone due to issues such as land acquisition (See the Jakarta-Bandung High Speed Rail case in Box 10), with complex administration and bureaucracy oftentimes only complicate the process. Further, the second issue is related to **government's delay in determining funding scheme.** Indonesia's government often takes too long in evaluating funding scheme options, making the funds remain undrawn. This is evident in the case of Soekarno-Hatta airport High

[1] BAPPENAS is Indonesia's Ministry of National Development Planning

Speed Rail and MRT Jakarta, for instance. To tackle these, *inter alia*, the government is revitalising KPPIP, a committee mandated to accelerate delivery of infrastructure projects. The next section is provided to understand KPPIP and, in particular, how it prioritises projects in Indonesia.

KPPIP: a committee mandated to accelerate infrastructure delivery

In need of alternative source of funding, the government has displayed openness in leveraging financial markets and private financing. Regulatory reforms have been introduced to entice private participation, including the new Presidential Regulation No. 38/2015 which encourages public-private partnership (PPP) by expanding eligible sectors for foreign investments and providing friendlier legal framework. Moreover, this reform is accompanied by the creation of Committee for Acceleration of Priority Infrastructure Delivery (abbreviated to KPPIP in Indonesian) whose mandate is to create a pipeline of projects following the PPP model. Although this case study is specifically interested in its effort in prioritising infrastructure projects, the discussion starts with complete picture of the six tasks assigned to the committee:

- **To set standard of pre-feasibility study.** The committee starts by standardising the elements of pre-feasibility study (Outline Business Case). At this stage also, value for money analysis is included to support determination of funding scheme later. Having a well-documented project is essential, as in Indonesia, it has become a barrier for investors (see Box 8).

- **To prioritise projects.** Determination of priority projects takes feed from two sources: (1) top-down projects from the President or Vice President; and (2) bottom-up projects proposed by line ministries and local governments. As such, KPPIP does not propose new projects; it prioritises only from the existing pool. As per its mandate, the committee build the *Priority Projects* list through a three-staged process (see Box 7). Projects that are selected as the priority will receive further facilitation—all with a single goal of accelerating their deliveries. Priority Projects at the very basic level receive all facilities and special treatments given to *National Strategic Projects* such as permits and non-licensing, government procurement, government guarantee, debottlenecking, spatial planning, and land acquisition. But further, Priority Projects will receive additional facilitation during the development of OBC and Final Business Case (FBC), and other preparation facilities from KPPIP, Ministry of National Development Planning, and Ministry of Finance. Finally, the committee also creates and applies incentive/disincentive mechanism, such as giving priority quota in the coming year for the project owners (incentive), or conversely putting them in the blacklist (disincentive).

- **To determine funding scheme and source for Priority Projects.** There are three schemes in which priority infrastructure can be financed from. First is through the state budget. Allocation of state budget, regional budget, and Official Development Assistance involves coordination with Government Contracting Agencies and Ministry of National Development Planning (BAPPENAS). Second is by assigning SOEs, leveraging their financial capacities. Third is through PPP or strategic funding. This involves coordination with PPP unit within the Ministry of Finance to prepare of FBCs and provision of transaction advisory.

Box 6

HOW DOES SINGAPORE DO IT?

UTILISING EXPERTS IN DECISION-MAKING

Singapore leverages experts in infrastructure decision-making. Ministry of Finance (MOF) sets consultation process with experts represented by Development Planning Committee (DPC). Projects above SGD 500 million need concurrence from DPC before funds are disbursed by MOF.

- **To monitor and debottleneck.** KPPIP prepares action plans, monitors, and debottlenecks, taking the role of PMO for Priority Projects.

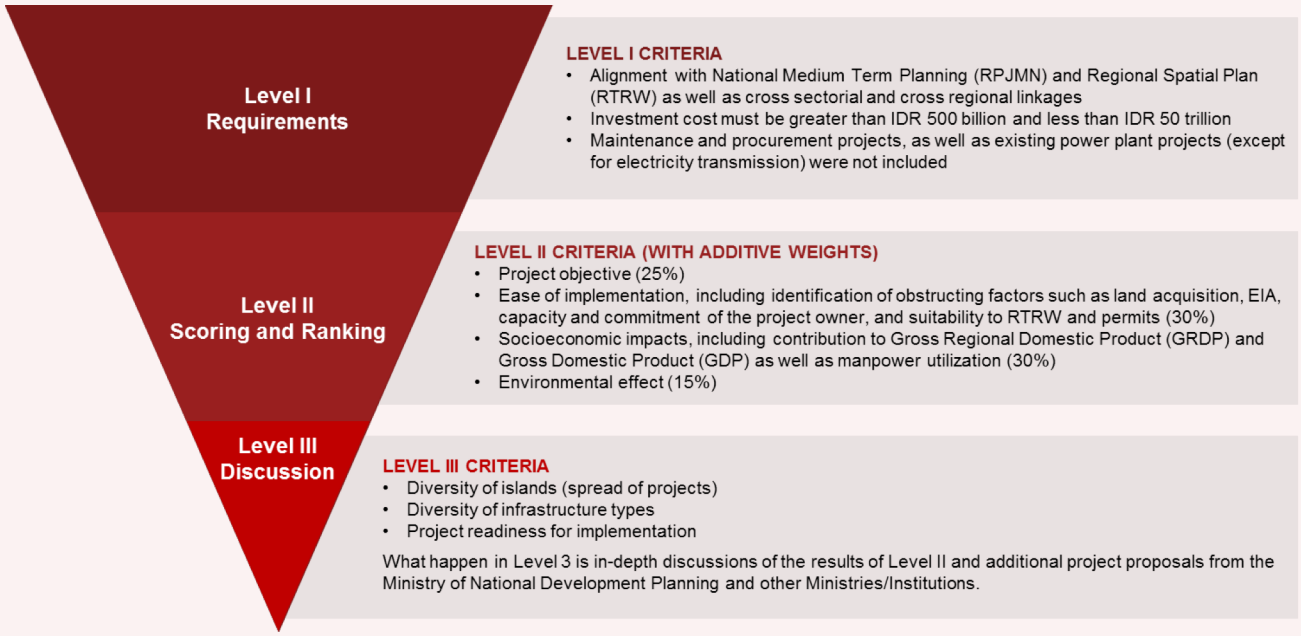
- **To develop infrastructure sector strategy and policy.**

- **To monitor and evaluate high-level issues.** The committee facilitates capacity building of government apparatuses and institutions involved in the provision of Priority Projects.

Box 7

KPPIP PRIORITISATION PROCESS

KPPIP's prioritisation process includes three level, including multi-criteria analysis in the second level.



Source: KPPIP and Marcelo et al. (2016)

This case study is particularly interested in KPPIP's task in prioritising projects. Looking at KPPIP's set of criteria, one can see a that KPPIP emphasises on project implementability. It explicitly requires the project to have committed champion. Another aspect within implementability outlook is that the project must not have critical technical issues. All in all, referring back to its prioritisation process in Box 7, its focus on implementability is also shown by the fact that implementability criteria is weighed higher at 30% (Marcelo et al. 2016).

The concept of prioritising infrastructure by countries is relatively new, thus there exists no widely-accepted definition of what is the best practice. This is also reaffirmed during the team's field visit. Accordingly, within its context and mandate, KPPIP's focus on prioritising projects largely for their implementability factor makes sense, as it is a committee that was established from the issue of disconnection between high-level political decision and on the ground realities of infrastructure delivery. As such, KPPIP was created to answer the problem synchronisation in implementing changes needed for infrastructure sector to grow (Haryanto 2015).

Box 8

INTERVIEW HIGHLIGHT

KPPIP AND ITS PENCHANT FOR IMPLEMENTABILITY

Our interviewees from KPPIP confirmed their affinity for implementability, yet its prioritisation process is still a multi-criteria one. For instance, as shown in Box 7, the committee also looks into economic and environment impact. For the economic assessment, the committee does it during the early stage, and assesses only the direct economic impact of the project. Nevertheless, our interviewees also made a comment that given the inelastic demand in Indonesia, it is not surprising that most projects easily pass this criterion. As such, there is a slight notion that economic impact assessment has low power in determining the final prioritisation outcome. Similarly, in regard to the environment impact (weighs 15 percent), our interviewees commented that potential negative environment impact of a project is at the end of the day not an issue. Not because the committee intentionally pass the aspect over, but because project proponents typically come with a careful plan to mitigate negative environmental impact already.

THERE IS ROOM FOR IMPROVEMENT

One of our interviewee, who is an infrastructure economist based in Singapore made a comment that the project prioritisation process in Indonesia is still a mystery—a black box. He made a comparison with other Vietnam, which he believes is more transparent in this regard. While the existence of KPPIP's multi-criteria framework is recognised, the process of developing the priority list seems yet to be transparent enough to outside observers. Our interviewee made no argument about the potential explanation for this, although one can hypothetically speculate that political forces still play an important role in determining which projects to push or drop. Indeed, as a government official in Jakarta mentioned in his interview, politics is still plays a huge role. He mentioned that technocratic works in prioritising—while important—will not by itself determine what the government will deliver.

While one can argue that such opaque process is expected in the context of Indonesia or other developing countries, our other interviewee, who is a management consultant specialising in infrastructure based in Jakarta made a warning. In his opinion, the underlying issue of Indonesia's infrastructure delivery is not so much on availability of fund, but on project pipeline that is not well-thought and well-documented, as well as creates shock to the market. Indonesia is attractive and funds would readily pour in, if only the project pipeline is well-thought and well-documented. On the other hand, such opaque process in pipeline development can bring shock as the market is not involved, unabling them in anticipating government's infrastructure plan. These are exactly the issues that KPPIP is mandated to tackle, yet seems like it is fair to infer that there are still room for improvement.

INDONESIA HAS GREATER BARGAINING POWER TODAY

Following up the assertion that fund availability is not the core issue of infrastructure financing in Indonesia, our interviewee who is a state government official in Jakarta agrees. He believes that Indonesia is currently in a good position to bargain terms of loan, not only due to its economic condition, but also because there exist greater competitive forces within lenders. Those who gives better term with less administrative or technical complication are preferred. This may have huge implication for AIIB, as it may need to balance its requirement for borrower without being contradictory to its own value. At present, our interviewee believes that lenders which offer both better loan arrangement and technical or administrative supports have the upper hand. However, as Indonesia develops its capability, it is very likely that technical or administrative supports will not be as important. Therefore, it will all be determined solely by how financial terms of the loan is arranged.

Land acquisition: still a major bottleneck in delivery

Land acquisition is arguably the single-largest issue in infrastructure delivery in Indonesia. This section is provided to the issue of land acquisition, particularly on the progress that the government has taken and market expectation towards such progress.

Tusk Advisory, a prominent infrastructure consulting firm in Indonesia, estimated that one-third of bottlenecks in priority projects relates to land acquisition issue (Kannan 2015). This results to

Box 9

HOW DOES SINGAPORE DO IT?

LAND ACQUISITION ACT

The land acquisition act gives the Government of Singapore constitutional powers to purchase private land for construction of mass-rapid transit (MRT) projects. At present, land sales are made at market price.

lengthy delays, cost overruns, and other financing issue such as delayed disbursement (see Box 11 for case of Jakarta-Bandung HSR disbursement). This issue has been acknowledged by the government and measures have been taken. From fiscal perspective, the Land Revolving Fund managed by Ministry of Public Works facilitates land acquisition by providing temporary coverage for toll projects (with project investors to reimburse later). For a less viable projects, the government is ready to provide subsidy. From regulatory perspective, the aforementioned new law limits land acquisition procedure to 583 days and allow takings for public interest. Furthermore, the government recently established the State Asset Management Agency (abbreviated to LMAN in Indonesian) which in 2017 was injected with IDR 20 trillion to not only revamp idle assets but also support land clearing for infrastructure projects. In its latter function, LMAN is expected to expedite financing process for land (PwC 2016). These reforms have shed hopes to investors. Yet, PwC (2016) further argues that there are ample room for improvement. First, LMAN might require even more budget for land acquisition. It was the case that LMAN has not been able to fully run its role in land acquisition issues. In some recent tenders, the government had to ask private sector to provide bridging finance for land acquisition.

Box 10

LOAN DISBURSEMENT AND DELIVERY BOTTLENECK: THE CASE OF JAKARTA-BANDUNG HIGH SPEED RAIL (HSR)

In 2015, Indonesia and China agreed to build the Jakarta-Bandung HSR. It was a surprise to some, including those in Jakarta city government; nevertheless, the ground-breaking ceremony quickly followed in early 2016. It was agreed that the 75 percent of the project will be funded through loan from China Development Bank (CDB), while the remaining will be from joint venture between Indonesian and Chinese firms. Yet, until February 2017 the CDB refuses to disburse the promised USD 5.2 trillion. The problem lies on land acquisition; "10 percent of the land for the project remains to be acquired," said Antonius Kosasih, President Director of PT Wijaya Karya, a state-owned construction company that handles 30 percent of the project. The decision by CDB to not disburse its loan is not without reason, as the agreement stipulates that disbursement will be made once all land for the project is acquired.

Source: Field interview, The Jakarta Post (2017), Oktara (2017)

JAKARTA

Covering an area of more than 7,500 sq.-km and with a population of more than 10 million (DKI Jakarta 2013), Jakarta is the heart beat of Indonesia. It serves the country at multiple fronts, not only as a capital where the central government sits but also as the country's focal point for cultural and economic activities—80% of the country's economic transactions are in Jakarta. Its many opportunities attract people, creating rapid urbanisation (Mungkasa 2015). Traditionally, this is a good news, as urbanisation usually occurs in tandem with economic growth (World Bank 2016). As an example, for every one percent of urbanisation, Vietnam gains six percent in growth while Thailand gains 10%. Unfortunately, Jakarta's figure is as low as two percent (World Bank 2012), showing that the megacity is trapped in diseconomies of scale. As such, rapid urbanisation means even greater burden. Particularly within the context of infrastructure, World Bank urban development expert Josie McVitty argues that Jakarta's rapidly growing population does not come with good planning. Decentralisation after the Suharto's fall has put infrastructure responsibility under the authority of the local governments. Yet, as budgets are prepared annually, many

contracts have to be renegotiated every year, increasing transaction costs and limits the city's ability to prepare and implement large-scale multi-year projects (Hamer 2014).

In line with the central government's agenda, the city government has pushed for advancing infrastructure development; and further, to do so in a more sustainable way. In 2007, Jakarta joined C40 Cities Climate Leadership Group, a network of megacities committed in reducing GHG emission and climate risks. With C40, it has agreed to reduce emission through community-scale development and procurement of mass transit system ("C40" 2017). In 2009, during COP15 in Denmark, the government made a commitment to cut GHG emission by 30% in 2030 (the *30:30 commitment*) and quickly initiated its Local Action Plan in the same year. Three years later, government regulations related to the action plan and regarding green building requirement were signed. In 2016, Jakarta's Grand Design on Green Building was published, and in the same year, it was selected to join 100 Resilient Cities (Mungkasa 2016). While seems visionary, this is frankly anchored also to the emergencies that the city face. For Jakarta, it is more true that embracing sustainable approach to urban development is a matter of immediate survival.

Unlike many other cities in the country, Jakarta's urban issues subscribe to the city's status as a megacity. It might still face the classical constraints of infrastructure development in Indonesia, yet with its massive size, Jakarta also has better leverage in realising its megacity ambition. This section about Jakarta is structured as follows: it starts with a discussion on the most-pressing urban issues for the city, followed by the plan to solve them. Further, the discussion moves to the theme of infrastructure development, starting with an examination of how infrastructure becomes part of the solution, followed by infrastructure challenges specific to Jakarta.

The capital's most-pressing urban issues

In its Regional Long Term Development Plan 2005-25, the city government outlines 20 strategic issue that it aims to tackle (DKI Jakarta 2013). Yet, upon further inspection and interview a city government official in Jakarta, these issues can be narrowed-down to four.

These are Jakarta's four most-pressing urban issues:

- **Flooding.** Flooding has troubled Jakarta since the 1600s (World Bank 2016). The city is located in a deltaic plain crisscrossed by 13 natural rivers and more than 1,400 kilometres of man-made waterways. Approximately 40% of the city is below sea level, making it prone to flooding from water draining through the city from hills in the south, as well as from coastal tidal flooding in the north. In 2014, flood affected 17% of the city and displaced 64,000 people (Ika 2014). Unfortunately, majority of the victims are the poor (World Bank 2011).

- **Relative sea level.** Jakarta is sinking, and it is due to the combination of rising sea level and subsiding land. It is estimated that sea level will be three to seven meters above Jakarta's ground in 2080 as its land is subsiding at a rate of between 2.5 to 14 centimetres per year. In line with its flooding issue, relative sea level is indeed a matter of urgency for Jakarta. The city is growing yet getting closer to being unliveable at the same time.

- **Water.** Water issue in Jakarta is a combination of scarce supply of fresh water and untreated waste water. As population grows, the city's need of fresh water also increases. The government claims that provision of fresh water covers 75% of households in Jakarta, yet the quality is still substandard due to combination of low quality of the groundwater itself and of the distribution pipe.

- **Traffic congestion.** Jakarta is notorious for its traffic congestion—estimated to cost the city at ~IDR 12.8 trillion (USD 950 million) annually ("Jakarta Urban Transport Problems and Their Environmental Impacts" 2014); although others such as JICA and BAPPENAS (2004) estimate the figure to be as much as USD 6.5 billion. Apparently, growth of road construction (0.01% p.a.) cannot keep up with the growth of vehicle (9.5% p.a.). As such, experts argue that the root cause of Jakarta's traffic jam is dependence on private vehicle (Asrining Rini 2010). Prima facie, this assertion is plausible as Jakarta did not have a good public transportation system.

The four issues that Jakarta faces are matters of remediation. The government needs to think to not make matters worse—at the very least. Furthermore, these issues do not come in silos as they are intrinsically related to each other. Following this logic, the government has created an integrated set of solutions, as discussed in the next section

The sustainable city solution

To solve the four issues, the city government comes with four urban regeneration solutions.

- First is by transforming Jakarta in accordance with **compact city** concept, focusing on transit oriented development approach, mainly to answer the traffic issue. More efficient use of land, such as by exploring the possibility of underground and elevated spaces development is also considered given the limited land availability.

- Second is by implementing **climate adaptation strategy** with a mind-set shift: from merely targeting greenhouse gas emission reduction to advocating urban greening in its spatial plan. The second solution is largely deployed to answer flood, relative sea level, and water issues.

- Third is by improving **resilience**, mainly to tackle relative sea level and water issues through its mega project in Jakarta Bay: National Capital Integrated Coastal Development (NCICD), that includes the famous construction of sea wall.

- Finally, the one that enclosed all issues and transform the way the city government operates is by adopting **technology-based city planning and monitoring** through the introduction of Jakarta Smart City platform. Interestingly, the smart city concept in Jakarta also leverage community participation such as through real time issue escalation.

Circling back, one should already see that three out of the four solutions are aimed at ensuring immediate survival; these are the *firefighting* solutions. Only one—the smart city solution—that

is truly *visionary*, in the sense that it is actually non-essential to resolve Jakarta's emergencies but truly a catalyst for other solutions as well as for future development.

Nevertheless, while the solutions that the government offer seem to touch all aspects of people, process, and technology, it is also true that they still rely largely on provision of hard infrastructure. For instance, it is by no coincidence that all national priority projects in Jakarta are within the themes of the aforementioned solutions. The Jakarta Sewerage System is funded through the state budget with a loan from Japan, the phase A of National Capital Integrated Coastal Development (NCICD) is funded 50:50 through state and regional budget, and finally three transportation projects: Jakarta MRT; LRT; and airport railway. Only the smart city project is not in priority list, and indeed the challenges to advance this vision seem to be dire.

Assuming that those solutions are the most effective ones to tackle Jakarta's four issues, it is far from surprising should the AIIB decided to invest in them. Yet, another fork on the road is for AIIB to decide whether it would be part of the *firefighting* or the *visionary* solutions.

Investing in the advancement of smart city might be a good idea

Smart cities employ innovative services and concepts to improve triple-objectives of cities: economic viability; environmental sustainability; and citizen well-being (Rubel 2014). There is yet a firm definition of 'smart cities' due to the myriad of approaches undertaken by city planners in their respective vision of a smart city. Amsterdam, for one, focuses on green living with projects such as "Grid Friends" that enable the sharing of renewable energy within a residential precinct while the Songdo International Business District in South Korea harnesses the benefits of modern technology to improve everyday living for the city's inhabitants. Currently, there exist plans and demonstrated action to move Jakarta towards smart city. AIIB should consider investing in Jakarta's smart city projects based on the three following factors:

- **A cross-cutting solution.** The concept of smart city has been advocated all around the world. Bringing together information from different corners of the city brings benefits such as better city operations and decision making. Jakarta has certainly embraced this idea, also aiming to reap the promised benefit of smart city for a variety of solutions. In its 2025 vision, for instance, the city government aims to have smart flood prevention system, smart traffic management, and smart water metering system. As such, the city government has already seen a cross-cutting solution to its issues.

- **Trending yet not fully tapped.** Yet, our visit to Jakarta has suggested that there are room for improvement that arguably requires further investment. For instance, the very basic requirement (i.e. data quality) is actually still questionable (see Box 12). With government's budget tied to finance the *firefighting* solutions, it is not surprising to hypothesise that the smart city program has been underfunded. Of course, this statement need to be further tested.

- **Also aligns with regional agenda.** Jakarta should also be seen in its regional context—that is as a megacity within ASEAN. The regional community has set its eyes to achieve ASEAN Connectivity in 2025 to promote competitiveness, inclusiveness, and a greater sense of community (ASEAN 2016). One strategic objective aimed by the ASEAN Connectivity is digital innovation that includes technology adoption and data sharing among governments—both can be leveraged through smart city concept. As such, advancing smart city would not only benefit the city but may also push greater regional integration.

As we believe that investing in advancement of smart city in Jakarta may be a good idea, the last part of this section circles back to the prioritisation framework given in chapter two—to give a better idea on how important project such as the smart city fits in the framework. In the framework, a special layer is created to account for importance of **connectivity**. This layer is provided precisely to accommodate cross-cutting projects such as the smart city, whose score may not stand out within the traditional impact components, yet entails higher strategic purpose.

Box 11

INTERVIEW HIGHLIGHT: HOW SMART IS *JAKARTA SMART CITY* TODAY?

The basic idea of Jakarta Smart City project is to leverage IT in city operations. At present, its most obvious impact to the city comes from two front: *smartcity.jakarta.go.id* portal which give access to monitor and evaluate development in the city; and QLUE application that enables citizen to report issues, with a hope of quick government response. In our discussion with Jakarta Smart City, our interviewees mentioned their vision to enable data-driven policy making by next year. While it sounds interesting, we believe that many prerequisites need to be put in place. First and foremost is on data quality. World Bank (2011) once mentioned data availability and quality as a key constraint for effective delivery of urban issues in Jakarta. Our visit to Jakarta Smart City centre shows that this issue is still relevant even after the introduction of this project. Currently, the team at Jakarta Smart City only collects and presents data while the decision to update the data is still within the prerogative of the data owner. With no power to chase data owner to update, data quality can be questioned. Turning data to intelligence is one of smart city ideals, yet one should recognise the necessary steps to reach that ultimate phase: it starts with data collection and followed by data integration, before one can finally analyse and draw meaningful insights from the data. Yet, when data quality is still low, perhaps Jakarta requires more time to improve the upstream before it can fully implement the envisioned data-driven policy making.

BOGOR

Home to the famous Bogor Botanical Garden, coincidentally celebrating its 200th anniversary this year on May 18th, Bogor boasts its excellence in promoting green and sustainable growth (The Jakarta Post 2017). Bogor is part of the West Java province of Indonesia, located 60 kilometres south of the Jakarta. The city is known for its large tourism industry and natural landscape along with bustling commercial activities fuelling the economy (Pojani 2017). City of Bogor has seen nearly threefold increase in population since the new millennium following, a similar demographic trend to other peripheral cities surrounding Jakarta (Population.City 2017).

In response to the rapid urbanisation phenomenon influencing infrastructural needs of the city, the municipal government of Bogor refrained from being complacent. The city government took on multiple initiatives to handle corollary issues. The city government took on multiple initiatives to handle corollary issues. Some highlights of its initiatives include (see Box 12):

- The Sustainable Urban Transport Improvement Project in cooperation with the German Federal Ministry for Economic Cooperation and Development (BMZ);
- Urban Low Emission Development Strategies (LEDS) Program in cooperation with ICLEI Local Governments for Sustainability; and
- Indonesia Urban Water Sanitation and Hygiene (IUWASH) in cooperation with the United States Agency for International Development (USAID).

Moreover, under the leadership of Mayor Bima Arya Sugiarto, the city has set sail towards a Smart City Project to equip the city with necessary capacity to make Bogor "a comfortable city, faithful and transparent."

Box 12

INTERNATIONAL COOPERATION HIGHLIGHT

SUSTAINABLE URBAN TRANSPORT IMPROVEMENT PROJECT (SUTIP) IN COLLABORATION WITH BMZ

Although relatively small, Bogor is not excluded from traffic congestion and increased air pollution due to high occupancy and growth of private cars. The project is working to improve the policy framework for the introduction of climate-friendly mobility (strategies, guidelines, five-year planning). It advises the urban transport department of the Ministry of Transportation on drafting and implementing key documents. It also attempts to integrate national guidelines into municipal transport plans and implement new action plans for the sustainable development of transport. Through the project's support for a revised national transport policy, municipal transport policy in Bogor now complies with principles of sustainable urban mobility. First, last year the mayor issued a decree on quotas for taxis, online-based ride-sharing cars and motorbikes last year to ease traffic congestion and incentivise people to use public transport. Second, Bogor is currently building their first-ever BRT or public bus system. Third, Bogor has introduced new parking management and motorbike usage. BMZ is heavily involved in developing these policy recommendations.

URBAN LOW EMISSION DEVELOPMENT STRATEGIES IN COLLABORATION WITH ICLEI

Bogor city government developed a low emissions development strategies on sustainable landscape planning, transportation, energy efficiency, improved solid waste management and waste-to-energy conversion. Side by side with this initiative and supported by the World Bank, Bogor has initiated a waste-to-energy program composting 20 tons of waste to energy which has reduced emission by 9,072 by CO2 per year. The government has set a renewable energy target for government operation for 33% by 2020.

INDONESIA URBAN WATER SANITATION AND HYGIENE (IUWASH) PROJECT IN COLLABORATION WITH USAID

Bogor's hilly topography makes it hard to build a sanitation system that can reach everyone living in the city. Even though the government has tried constructing a standardised wastewater pipeline connected to a wastewater treatment plant (WTP) through the Sanimas program in 2013, it could only serve a few of Bogor's citizen. Meanwhile, the demand from the community to get connected to the Sanimas WTP is very high. IUWASH came in and helped local communities with advocacy to get support from the local water supplier UPTD PAL. Initially, the negotiation was in gridlock because local communities and UPTD PAL did not reach an agreement on funding. IUWASH then came up with an alternative funding option, that is through micro financing. Additionally, IUWASH trained several "health cadres" or "champions" to help promote the sanitation system. IUWASH then helped set up a community-based organisation, KSM Amanah, that will be responsible to manage and operate the communal WTP once it's operational, also to collect the subscription fee from future customers. Currently, there are 53 households connected to the Communal WTP managed by KSM Amanah in Sindangsari Village or an addition of 39 connections from the initial number.

Source: BMZ (2016), Urban LEDS (2014), USAID (2015)

Bogor's most pressing issues

Bogor takes pride in being titled as a green city; located in the highlands, Bogor's high precipitation rates blesses the city with green landscape. Prima facie, the city seems all positive, yet this does not necessarily mean that it is without issues. Here are Bogor's three most-pressing issues—all pivots on the population figure, which is estimated to almost double by 2030 as well as its proximity to the capital:

- **Preserving quality of space.** Starting with vast green open spaces, Bogor is constantly confronted with the pressure to convert land use as to grow economically or simply to accommodate population rise. In the past, land conversion permits are too easy to get, threatening the city's quality of space.

- **Traffic.** The team visit to the city has shed the light that the city's traffic issue is largely due to the concentration of mobility. There are public activities nodes, for instance, which create bottlenecs to the whole traffic system.

- **Waste management.** Not only that Bogor's population is growing rapidly, the city is also close to industrial areas. As such, Bogor will need an integrated and smarter waste management which should not only aim to reduce pollution load but also to enhance upstream water quality and improve the quality of life of people living along the riverside.

Barriers to implementation: funding and technical capacities

In our discussion with officials of the city of Bogor, it was clear that the city needs both funding and technical assistance to realise their sustainable city ambition. The funding issue is typical, but as a small urban-centre, the officials believe that it requires help in building its infrastructure-related capacity. This section discusses both issues; on the funding side, this section focuses more on power play in Bogor; while on the technical assistance side, more focus is also given to how the city perceive innovative scheme such as PPP.

The very first statement by the city officials when asked about funding infrastructure in Bogor was that it is impossible to rely on local budget alone. While one might readily assume that it is the usual issue of budget constraint, the official continued by mentioning how government need to put a lot effort in dealing with the local parliament. This issue is particularly true in the context of prioritising which infrastructure projects to be funded first. Local budget is created with approval from the local parliament whose members oftentimes push for projects that gives impact to their local constituents. As such, political interest of the parliament members plays a huge role in determining which project—and in which localities—would get funding. On the other hand, although decentralised, city government surely can always tap the national government to facilitate access to funding, but this also involves power play. Our interviewee objectively mentioned that the national government would look into three things. First is the performance of the local government as measured by some objective indicators. Second, the national government is interested in the potential of the region, thus running affirmative actions that funding might

still be allocated although the local government's performance is not as bright. Finally, the third aspect is really on political networking—how close the local leader is with the national government. This last aspect should be surprising given the context, but it also shows the difficulties that local government might face in regard to securing funding for its infrastructure ambition. PPP as one alternative scheme to gain funding was also discussed during the interview. Yet, the bottom-line of the discussion narrowed to the belief that PPP is a complicated process for a small urban centre like Bogor. Our interviewee believes that when a megacity such as Jakarta is not always successful in PPP, one should not expect a small city like Bogor to try that path. Indeed, this is closely related to the issue of government capability to do so, as discussed in the upcoming section.

As mentioned, the city government's issue does not stop with funding; technical capability is also an issue. Many agencies are said to have visited Bogor to conduct capacity building programme, yet our interviewee believes that there is always something lacking, with potential reason for this includes the sporadic fashion of such assistances. Interestingly, there are also cases in which funding for infrastructure is available, yet the technical capability to design and execute the project is not—as in a bridge project near Kujang area in the city. At the end of the day, such planning issue impacted project delivery.

Sustainable transport solution

On average, there are 1.2 million trips happening every day and approximately 600,000 of them are commutes between Bogor and Jakarta. Due to inadequate public transport system, here is heavy reliance on private cars and motorbikes. In the past decade, public transport usage has decreased by 23%, meanwhile ownership of private cars and motorbikes increased respectively by 8.4% and 13.3% each year (Winstock 2016).

Bogor city government has made several policy efforts to ease traffic congestion and reduce pollution. One of them is to impose quotas on traditional taxis, online ride-sharing services and motorbike. But this alone is not enough. The government has created a road map to convert the city's public transportation landscape through the much needed procurement of Light Rail Transit (LRT) and Bus Rapid Transit (BRT). Hence, AIIB should consider investing in Bogor's planned BRT and LRT projects due to the following:

- **Increase intra- and inter-connectivity.** As a fairly small-urban centre with one million populations, Bogor does not need an MRT yet for intra-city transport. At the same time, Bogor current public transport system, TransPakuan, needs a major upgrade and rejuvenation. Hence, BRT is occupying middle ground between MRT and traditional bus systems. In ways, it offers the best of both worlds: the speed and reliability of rail and the operating flexibility and lower cost of a conventional bus (Deng and Nelson 2011). Early BRT adopters, such as Ottawa and Curitiba, built busways mainly because they were more affordable than LRT (Cervero 1998). However, the Bogor case is unique because half of the 1.2 million commutes happening every day is an inter-city commute to Jakarta. To meet the current demand and anticipate future needs, Bogor needs to build both BRT and LRT simultaneously to increase intra-city

connectivity and inter-connectivity between Bogor and neighbouring cities e.g. Bekasi, Tangerang, Jakarta.

- **Improve urban liveability.** Bogor has already built the building blocks towards a sustainable, liveable city through initiatives such as building pedestrian walks and converting street lighting to light-emitting diodes (LEDs). Building BRT and LRT will further improve the overall quality of urban life through a more optimised road network; improved travel time and travel efficiency; and a less polluted environment. The BRT and LRT project can transform Bogor into a more liveable city.

- **Curb GHG emissions.** Approximately 89% of Bogor's produced GHG emissions—4,970,635 tCO2 * Scope 1 emissions—come from fuel combustion activities (Urban LEDS 2014). A clean, reliable and integrated public transport system will incentivise public transportation usage and less usage of private cars and motorbikes and in turn will help curbing carbon emissions. Combined with climate-friendly technology such as the Euro-4 or Euro-5 emission compliant diesel engines, the BRT and LRT project will be able to help Bogor realising its low-emissions vision. This also bodes well with AIIB's motto, clean, lean and green.

- **Strong leadership and alignment to planning.** Bogor has embedded low emissions development strategies considerations into its medium- and long-term development plans. The government has also allocated a significant amount of money for low emissions-related activities as evidences have shown. With strong alignment between infrastructure planning and implementation, complemented by strong leadership from its current mayor, Bogor proves to have high capacity to execute medium- to long-term infrastructure projects (Isnaeni 2013).

Vietnam: poised for economic growth

The Doi Moi economic reform instituted by the Vietnamese government in 1986 has been widely recognised as the key catalyst for Vietnam's strong economic performance. It redirected the country's economic orientation from a socialist economy towards an outward market-oriented approach. The reform's most significant changes entailed prioritising exports, developing production capabilities, providing employment opportunities, and increasing the country's foreign currency reserves. Vietnam's increasing prosperity enabled socio-economic uplift of more than 28 million Vietnamese from poverty over the past 15 years and led the World Bank to reclassify Vietnam from "low-income" to a "low-middle income country."

Well-positioned economic growth

The Vietnamese government has pushed for further economic liberalisation such as reforming investment and property laws, and pursued greater participation in various international trade deals. Vietnam's 2015 GDP growth was in excess of 6.5% and recorded a 9.2% year-on-year export growth with a positive outlook for both exports and FDI growth.

Socio-economic conditions have also raised Vietnam's overall attractiveness for foreign investors. Vietnam is able to leverage its "golden age structure" and low-wage workforce to drive further economic development that complements the positive effects from trade policies and reforms.

- **Golden population.** In 2014, approximately 40% of the Vietnamese population are between the ages of 18 to 24 years of age. According to the United Nations Populations Fund, this demographic window of opportunity remains open until 2040. Vietnam is currently able to capitalise on its young workforce to drive innovativeness and productivity (Nguyen 2014).

- **Labour market conditions.** Vietnam has witnessed an increase in foreign firms from across the globe that are eager to capitalise on the low wage labour environment. This includes multinational corporations such as Canon and Foxconn that have started manufacturing lines in Vietnam - the low wage and the availability of labour are attractive for the huge workforces needed by each company to turn over high volumes of products.

HO CHI MINH CITY

Widely regarded as Vietnam's principal economic hub, Ho Chi Minh City is a buzzing metropolis that generates a fifth of national GDP and is home to many multinational firms. The city currently has a population of approximately 9 million people and its economy had averaged around 10% nominal GDP growth in the past 5 years. It's robust economic infrastructure has led to the development of a mature commercial, banking and finance, and advanced technology sector – all of which provides high-skilled job opportunities for the skilled workforce. The city's manufacturing sector, that accounts for 45% of the country's gross manufacturing output, provides significant labour opportunities for the low-skilled labour force. Ho Chi Minh City's future as a megacity is

unquestionable as people are attracted by the better career prospects, competitive salaries, and job market growth.

Urban Infrastructure Challenges

As the city continues to experience burgeoning inward migration, the rising needs of the growing urban population will not be sufficiently addressed by the current state of urban infrastructures. Among the city's most pressing urban infrastructure needs, improvements to transport infrastructure is critical - traffic congestion costs the city an approximate USD 820 million in commercial revenue opportunity, according to Associate Professor Pham Xuan Mai from Ho Chi Minh City's University of Technology. The following provides other exacerbating factors contributing to Ho Chi Minh's transport challenges:

- **Inadequate supply and options of public transportation.** Public service buses are the primary mode of transportation available in the city. However, bus services only satisfy a mere 7% of travel demands of Ho Chi Minh City's urban population – despite having the country's most expansive route network. While there are approximately 3,000 public buses in Ho Chi Minh City, only 2,000 are available for public consumption. This is in stark contrast to the 7,000 public buses available in Wuhan, China, for a population of 9 million people and to the 6,000 public buses available in Bangalore, India, for a population of 7 million people.

- **High vehicle volume.** Private vehicle ownership in Ho Chi Minh City has swelled from 131,000 to 500,000 within a decade (from 2001 to 2012). With increase affluence due to economic growth, the urban population is able to afford private vehicles to overcome the city's public transportation inadequacies; however, this has aggravated the city's traffic problems since vehicles travel at lower average speeds along with an increase in traffic accidents. Private vehicle ownership is expected to increase since purchase price of private vehicles are expected to fall following the elimination of import taxes from ASEAN countries in 2018 due to ASEAN trade agreements.

Like many other coastal cities, Ho Chi Minh City contends with hydro-related challenges – the city's low elevation topography and vulnerability to seasonal monsoon rainfalls result in high incidence of inundation across the city. A study by the Institute of Urban and Regional Planning by the Technical University of Berlin suggests that Ho Chi Minh City is vulnerable to global warming since it is situated on low-lying lands and nearby water sources such as the Mekong delta and Red river has experienced rising water levels (Atkinson, 2012). In addition, non-geological-and-climate-related factors such as poor sanitation capabilities have contributed to frequency of flooding. A variety of socio-economic implications have arisen due to the lack of adequate urban infrastructure: (i) vulnerability of poor to flooding since they primarily live in flood-prone areas, (ii) decline of economic activity due to disruption of transportation for goods and people, and (iii) decline of city liveability as untreated water is discharged into main water arteries and flood areas across the city.

- **Inadequate sewerage system.** The city's sewerage connection to residential and commercial facilities is relatively high at 60%. However, only 10% of urban waste water is treated despite

efforts in improving the city's sanitation situation. The remaining untreated urban waste water is directed towards the Saigon river and causes unwanted pollution. Due to heavy rainfalls or chokes in the sanitation canal, water from the Saigon river will flood areas of the city and have debilitating effects on traffic, environmental pollution, and human health.

- **Overexploitation of underground water.** Due to a growing urban population, Ho Chi Minh's water demand is estimated to jump from 3.2 million m^3 per day to in 2015 to 4.1 million m^3 per day in 2025. The increase in water consumption resulted in underground water level to fall 2-3m per annum and is a key contributor to ground subsidence – recent findings from a study by MPI stated that the ground had subsided 15 mm per year. Ground subsidence due to overexploitation of underground water also leaves the city more susceptible to flooding.

Box 13

INTERVIEW HIGHLIGHT: RISING ENVIRONMENTAL CONCERNS AMONG THE POPULACE

The current administration's focus on driving further economic growth has led to significant investments in intra and inter-regional connectivity such as highways and airports. However, growing public pressures has led to increased attention being paid to environmental impact. Several interviewees had mentioned that air pollution is one of the key public concerns since there has been a salient decline in air quality due to the rise of the manufacturing sector in Ho Chi Minh City. Therefore, the government has been more active in tackling environmental issues in recent years.

Implications for AIIB

Vietnam's economic potential will not be realisable until the inadequacies in inadequate infrastructure stock and quality is addressed. AIIB could complement the already active efforts by the AIIB and ADB to improve Vietnam's infrastructure landscape. However, AIIB should be aware of the following endemic challenges to urban planning and project management that current infrastructure players in Vietnam face:

- **Absence of environmental planning.** The current environmental master plan for Ho Chi Minh City is not comprehensive as clear guidelines and regulatory meanings are absent. Some implications are ill control of industrial pollution, continued poor water quality of rivers and canals, and urban solid waste accumulation in sewerage system that have yet to be dealt with effectively.

- **Poor planning and management of projects.** Authorities have not succeeded in timely delivery of public transportation development projects. While this delays the increased supply in transportation services to the public, it also contributes to overall traffic congestion due to the construction work and diversion of traffic to non-optimum routes. According to one interviewee, the Japan International Cooperation Agency (JICA) experienced significant delays in operationalise a highway in Hanoi since the government was not able to reach a timely settlement with property owners who land had been demarcated as highway's exit road.

The Framework in Action

A story of simulation

This chapter is reserved to test the framework's practicability, to identify its inadequacies, to improve its applicability and adaptiveness, and to shed some light on its merits and caveats for future use. The framework has been applied to five completed or existing projects to generate a combination of quantitative and qualitative assessment results.

SIMULATION SETUP

In an attempt to test the applicability of the framework, the simulation used data from existing reports and was conducted with the following setup.

Data source

The data used in this simulation is extracted from World Bank reports of past projects. Single and indirect source might be challenging for the lack of triangulation, yet is efficient—further considering that the objective is to evaluate the applicability of the framework. Moreover, single source, to some extent, ensures the consistency of appraisal methodology and hence the comparability of data from different projects. Nevertheless, there are occasions when all desired data are not fully available in the reports, as well as when existing measurement methods are not compatible with the framework.

- When the criteria are relevant, yet data is not available, we approximated the normalized score based on our own judgement—supported by qualitative justification. For example, job creation is an important economic criterion relevant to almost all cases, yet is largely missing in the reports. For this criterion, we derived the impact score from our observations of the project components.
- When the criteria are relevant and data is available, but the level of data availability is not sufficient for quantitative assessment, we adopted a qualitative method. For example, in assessing the potential impact of a BRT project on air quality, quantitative emission indicator is important. However, the reports only hinted that the air quality would be improved in general without reference to any number. We thereby qualified the impact by using the existing narrative that air quality would be improved as commuters substituted the new way of transportation for conventional ones.
- When the criteria were irrelevant to the project, we assumed the impact was neutral and the normalised score was zero.

Type of projects chosen

Projects chosen in this simulation are cross-sector and cross-city, as the framework was developed with an intention to directly compare various types of project. In terms of sector, the chosen projects range from energy transmission to green transportation and from environmental sanitation to slum upgrading. Moreover, this simulation covered projects from Jakarta, Ho Chi Minh City, and Bogor, in accordance with the case studies, and took into account the city context as a strategic factor in assessing the overall project impact.

SIMULATION RESULTS

According to the principle of comprehensiveness, the team chose five projects from three cities that cover four sectors: transportation; energy; sanitation; and slum upgrading. The following sections delineate the objective and components of each project, illustrate a preliminary mock-up result, and end with some strategic considerations related to the project.

1: Indonesia second power transmission development project

The development objective of the Second Power Transmission Development Project for Indonesia is to meet growing electricity demand and increase access to electricity in the project area by strengthening and expanding the capacity of the power transmission networks in a sustainable manner. The project has single component with two parts. The first part is the extension and rehabilitation of selected existing 150-20 kilovolt (kV) substations and 70-20 kV substations in the project area. The second part is the construction of selected new 150-20 kV substations in the project area, including the installation of transformers and associated equipment.

Below is a preliminary scorecard of impact assessment:

Criteria	Justification	Score
Economic		
Direct job creation	Limited impact on direct employment as power grid requires a small group of technicians to build and maintain.	0.2
Number of direct beneficiaries	Significant impact: 29.5 million direct beneficiaries.	1
Change in direct government net revenue	Medium impact as a result of increased proportion of new customers, and increased number of customers who upgraded from 450VA to 1300VA	0.6
Social		
Accessibility to social services	The project provides electricity transmission and distribution services in Java, Bali, Sumatera, Sulawesi and Kalimantan islands.	1
Attitudes towards policy/project	Negative health and safety risk due to storage, handling, use and disposal of hazardous materials such as transformer oils	-0.2
Evictions, demolitions and resettlements of people	The requirement of temporary or permanent access to roads, transmission and distribution lines, substations and any other works resulted in land acquisition. Compensation has been completed.	-0.5
Liveability level	Percentage of urban direct beneficiaries	0.6
Community and stakeholder engagement	The Indigenous Peoples Plan will address the process of identification, consultation and social impact assessment.	1

Access for women and the disabled	The project will neither directly promote nor sustain any gender inequalities in the country	0.5
The poor's access to human, social, and financial assets	Project investments (sub-projects) are spread in various urban, suburban and rural areas in Java, Bali, Sulawesi, Kalimantan and Sumatra islands.	1
Environmental		
Air quality	Noise, dust, vibrant to surrounding properties, reduced vegetation during the construction	-0.1
Water quality	Leachate and odour from temporary domestic solid waste management must be treated so it will not pollute the ground or surface water course	-0.1
Greenhouse gas emissions	n/a	0
Energy efficiency or green energy	Energy transmission efficiency was improved.	0.2
Contamination of land	Soil and water contamination during construction and operation.	-0.1
Vulnerability to climate change and other disasters	No cultural property or natural habitat are critically impacted or will be impacted by the sub-projects.	0
Availability of (greenfield) land	Some land acquisition happened to be in greenfield land.	-0.1
Reputation		
Position the city/country as a good place to live, visit, and invest	This project will improve people's life quality and encourage businesses to invest in the country with the supply of electric power at lower costs.	0.8
Create visual architecture or unique scenic-landscape	n/a	0
Attract mega-events	n/a	0

There are three outstanding strategic advantages of this project. First, it was technically mature and was implemented by an established and experienced power utility (PLN). Second, the debtor is an affluent SOE with healthy financial situation. Third, this project could foster infrastructure connectivity and energy development to meet the country's economic growth target and to alleviate poverty in rural and suburban areas.

2: Indonesia national slum upgrading project

The development objective of the National Slum Upgrading Project for Indonesia is to improve access to urban infrastructure and services in targeted slums in Indonesia. The project has two components:

- The first component, integrated planning support and capacity building for Local Governments and Communities, will finance the costs of experts and community facilitators throughout the project cycle to support capacity building (including training, workshops, and knowledge exchange events between cities as well as urban districts) of local governments and communities in 154 cities to design and implement slum improvements, including the development of Slum Improvement Action Plans (SIAPs) at the city level and Community Settlement Plans (CSPs) at the community level.

- The second component, urban infrastructure and services investment support, includes two sub-components. The first is the improvement of primary and secondary

infrastructure and site development as well as the construction of connecting infrastructure; the second is the support for primary and secondary infrastructure and resettlement, including large-scale sanitation, water and drainage systems as well as strategic connecting roads.

Below is a preliminary scorecard of impact assessment:

Criteria	Justification	Score
Economic		
Direct job creation	Limited number of jobs were created during the construction of primary and secondary facilities. No direct employment impact after the project was finished.	0.3
Number of direct beneficiaries	Limited scale of direct beneficiaries compared to the local population.	0.1
Change in direct government net revenue	No direct contribution to government revenue.	0
Social		
Accessibility to social services	Increased health and other social services to the slum residents.	0.2
Attitudes towards policy/project	The project is designed to maximise participation of stakeholders and beneficiaries at all levels in order to ensure better governance and accountability, and improve the quality of implementation.	1
Evictions, demolitions and resettlements of people	Where involuntary land acquisition and/or resettlement/relocation is unavoidable, the local government will prepare a Land Acquisition and Resettlement Plan (LARAP) in accordance with the LARPF in the ESMF.	-0.5
Liveability level	The project increases city's ability to close its large infrastructure gaps through well-planned, and adequately supported urbanisation to enhance the liveability of Indonesian cities	1
Community and stakeholder engagement	The project will be aligned with the Affordable Housing Program's Low-Income Home Subsidy Component and use participatory approach under the coordination with local governments.	1
Access for women and the disabled	The project entails the following activities: (a) a quota requirement of 30% for female facilitators; (b) maternity leave for female facilitators; and (c) mechanisms to disaggregate data on beneficiaries and the quality of implementation process in the MIS.	0.3
The poor's access to human, social, and financial assets	The poor living in the slum are able to access to more primary and secondary facilities.	1
Environmental		
Air quality	Noise, dust, vibrant to surrounding properties, reduced vegetation during the construction.	-0.1
Water quality	Creation of stagnant water bodies in borrow pits, quarries, etc. suited to mosquito breeding and other disease vectors; Sewage which contains human waste carries pathogens and must be treated before discharge into the ground or an open water course	-0.2
Greenhouse gas emissions	n/a	0
Energy efficiency or green energy	n/a	0

Contamination of land	Roads/bridges located in critical lands that are sensitive to erosion and landslides; Leachate and odour from temporary domestic solid waste management must be treated so it will not pollute the ground or surface water course;	-0.2
Vulnerability to climate change and other disasters	n/a	0
Availability of (greenfield) land	n/a	0
Reputation		
Position the city/country as a good place to live, visit, and invest	The project will only improve a small community and will not have a great impact on the rest of the country in terms of attracting more tourists or more investments.	0.5
Create visual architecture or unique scenic-landscape	n/a	0
Attract mega-events	n/a	0

It is important to note that the selection of cities would be agreed with the MPWH and will depend on (1) the commitment of a local government to slum upgrading in its jurisdiction, (2) the number of people living in slum areas within a city and (3) the potential for a city to serve as a model for the rest of the program. Thus, we expect three strategic benefits from this project. First, the upgrading of slums per se would rejuvenate the city in an organic and egalitarian manner. Second, the construction of strategic connection roads between the slum and the main street would also improve the physical connectivity of the city. Last but not least, a successful implementation of the slum upgrading could serve as a model for other cities, facilitating the dissemination of institutional as well as innovative experience.

3: Ho Chi Minh City green transport development project

The development objective of the Ho Chi Minh City Green Transport Development Project for Vietnam is to improve the performance and efficiency of public transport along a high priority corridor in Ho Chi Minh City. The project comprises of two components.

- The first component, bus rapid transit (BRT) corridor development will include: (1) carrying out the construction and supervision of the BRT infrastructure and facilities; (2) improvement of the traffic management system, including the modification of intersection controls and the deployment of an intelligent transport system and associated technologies; (3) development of a fare collection system, including smart cards and servers; (4) provision of BRT vehicles and fuelling facilities; (5) carrying out integrated planning and urban development measures around BRT stations; (6) carrying out of marketing and public communication activities; (7) provision of support for project management; and (8) land acquisition and resettlement.

- The second component, institutional strengthening will include: (1) carrying out of training programs and technical support for relevant implementing agencies in project management, urban transport planning, and public transport operation including

strategic support for the operation of the BRT system; (2) carrying out of monitoring and evaluation activities, including the assessment of the BRT system success on an on-going basis; (3) carrying out of feasibility and design studies for maximising connectivity and ridership and continued development of the BRT system; and (4) carrying out of a study to develop the optimal fare structure and fare product range for the public transportation system.

A preliminary impact assessment is illustrated below:

Criteria	Justification	Score
Economic		
Direct job creation	Considerable job opportunities will be created both during the construction and operation phases, such as drivers, maintenance workers, and office staffs.	0.6
Number of direct beneficiaries	The Project will carry 24,700 passengers per day in 2019; 26,500 by 2020; and 28,300 by 2021.	0.15
Change in direct government net revenue	Low impact as the BRT project was intended to alleviate traffic congestion other than to generate taxation income.	0.2
Social		
Accessibility to social services	Separate public passenger transportation from other vehicles to increase and manage travel time as well as enhance reliability of public services because of efficient bus systems, low operational cost, less waiting time for passengers and reduce subsidies;	1
Attitude towards policy/project	Construction: Risk of fire and explosion (significant), Risk from operating CNG supply system (moderate), Increased risk of communicable diseases, such as malaria, HIV/AIDS (moderate); and affect local social secure, increase crime rate, drug use, prostitution, social conflict, etc. (moderate). Operation: Social security (moderate)	-0.5
Evictions, demolitions and resettlements of people	The project will require land acquisition, both permanently and temporarily, to construct the Technical Facility (1.8ha), End of BRT Route Terminal (0.6ha), and bus stops/access road across the BRT route.	-0.4
Liveability level	The project will accessibility and amenities to maximise BRT effectiveness; provide universal accessibility; and promote transit oriented development and greening of the corridor.	1
Community and stakeholder engagement	During project preparation, consultation has been conducted with various stakeholders, including potentially affected households, potential BRT users, local people along the BRT route (particularly at bus stop locations), staff members from UCCI, PMU, HCMC DOT, environmental and Feasibility Study Consultant.	1
Access for women and the disabled	Gender consultation was conducted with people potentially affected peoples (as a result of land acquisition), and potential BRT users, to inform the design of the gender mainstreaming action and gender monitoring and evaluation plan. The project was designed for the needs of the local users and fully accessible by people with disabilities.	0.5
The poor's access to human, social, and financial assets	Project area population composition: 30% of rich households, 50% of well-off households, 18% of the medium households and about two percent of poor households.	0.02

Environmental		
Air quality	The BRT system could be more preferred than motorcycle for people living in this corridor. This will help reduce greenhouse gases and air pollution; Construction: Transportations of material and waste will moderately affect people along corridor by dust and drop materials because this is high density of inhabitant as well as high traffic density.	0.6
Water quality	Wastewater from construction machines and equipment maintenances containing organic substances, oil and insoluble matters that are not controlled will pollute the surrounding water sources in Project area.	-0.1
Greenhouse gas emissions	Eventually this project will provide a commuting alternative and lead to the reduction in greenhouse gas emissions.	0.8
Energy efficiency or green energy	n/a	0
Contamination of land	n/a	0
Vulnerability to climate change and other disasters	Construction activities could cause to localised flooding because of interruption of water flow and floodwater in the local area.	-0.1
Availability of (greenfield) land	Some land acquisition happened to be in greenfield land.	-0.1
Reputation		
Position the city/country as a good place to live, visit, and invest	The project will have a positive impact on the quality of life for the majority of the people, will create jobs, will reduce traffic, will reduce pollution and attract more tourists and investments.	1
Create visual architecture or unique scenic-landscape	It will positively impact the city's landscape by focusing on modernisation. During our fieldwork study, the team checked the location of the project and the advertisement of this project at the construction site.	1
Attract mega-events	n/a	0

This project will increase the sustainability of HCMC's growth by contributing to the development of a multimodal public transport system that both induces more environment-friendly development patterns and curbs carbon-intensive private vehicle use. By introducing a new and green way of commuting, the project will contribute to the alleviation of traffic problems and refresh the urban landscape. A successful implementation of the BRT would set a model for the rest BRT lines in the future. The introduction of a traffic management system also could promote the innovation and integration of technological solutions.

4: Ho Chi Minh City environmental sanitation project

The objective of the Second Ho Chi Minh City Environmental Sanitation Project for Vietnam is to improve wastewater services in a sustainable manner in selected areas of Ho Chi Minh City (HCMC) and increase awareness on sanitation. The project consists of the following four components: (1) Interceptor component will be a large diameter that will contain the wastewater that is being discharged on the east side of the Saigon River without being processed in the treatment plant. (2) Wastewater Treatment Plant component will treat the wastewater collected in the NLTN basin and in the D2 areas. (3) Sewerage in District 2 Area component will complement

the larger flood protection measures for HCMC which are being planned by the Ministry of Agriculture and Rural Development (MARD). (4) Construction Supervision and Project.

A preliminary assessment of the impact is given below:

Criteria	Justification	Score
Economic		
Direct job creation	Limited impact on direct job creation as the interceptor, wastewater treatment plant, and sewerage require a small group of workers to build and maintain.	0.2
Number of direct beneficiaries	1.1 million beneficiaries account for 13% of the city population.	0.13
Change in direct government net revenue	Little impact on taxation income.	0.2
Social		
Accessibility to social services	The sanitation improvements that are planned under the project will help to reduce this cost in HCMC, benefitting the city and its entire population.	1
Attitudes towards policy/project	The project reduces health risks. About 65,000 people currently live in the District 2 area and the improvement in the sewerage system in the area will help to reduce environmental and health concerns.	1
Evictions, demolitions and resettlements of people	The project requires permanent land acquisition.	-0.5
Liveability level	The consultation results show that the participants support the project and recognise that their living conditions will improve due to the project.	1
Community and stakeholder engagement	Direct consultation with Householders/APs through questionnaires at each household.	1
Access for women and the disabled	Percentage of women among the beneficiaries connected to the combined or separated sewers in the NLTN and the D2 area.	0.39
The poor's access to human, social, and financial assets	Percentage of poor households affected by the project	0.37
Environmental		
Air quality	Dust and emissions from the transportation of soil, machinery, equipment and solid waste during the reclamation; dust from the process of reclamation, grading, digging and ground preparation	-0.2
Water quality	The project will reduce about 4.86mg/l of total nitrogen in 2045 in the Saigon River water compared to the present levels; transferring discharges from the Saigon River to the WWTP and discharged into the Dong Nai River, the water quality of the Nha Be River will be improved; the leakage waste water will be treated in the central WWTP of the landfill, which cumulatively will improve the environment quality surrounding the Da Phuoc landfill.	1
Greenhouse gas emissions	Construction: Emissions from the clearance and excavation; operation: Aerosols and odours (H2S, NH3, amino acid and mercaptan) from manholes and the interceptor line will be released when the dredging and repair are carried out.	-0.2
Energy efficiency or green energy	n/a	0

Contamination of land	n/a	0
Vulnerability to climate change and other disasters	The climate changes may affect HCMC overall due to impacts of rainfall and sea level rise. The construction area level of WWTP is relatively low. If the river water reaches over 2m, the WWTP operation will be interrupted.	-0.2
Availability of (greenfield) land	n/a	0
Reputation		
Position the city/country as a good place to live, visit, and invest	This project will upgrade and refurbish the environment, improve the image of Ho Chi Minh City with regard to its environment and public awareness.	0.8
Create visual architecture or unique scenic-landscape	Upgrading the urban landscape will improve the image of the country.	1
Attract mega-events	n/a	0

The strategic considerations of the sanitation project are threefold. First, it helps to improve wastewater services in a sustainable manner in selected areas of Ho Chi Minh City (HCMC) and increase awareness on sanitation. Second, its direct consequence is the purification of Saigon River, a hallmark of the city, thus rejuvenating the urban landscape. Third, the poverty mapping and method followed to improve sanitation for the poor could be used in other projects in the country.

5: Bogor urban water supply and sanitation

The primary development objective of the project is to improve and expand water supply services in the project areas by strengthening local water utilities to become operationally efficient and financially sustainable. The outcome of the project would be: (1) technical improvements to and expansion of production and distribution facilities, reduction of non- revenue water, improvements in water quality and greater operating efficiency; and (2) commercial improvements in PDAM corporate management. Five components were implemented in Bogor: (1) a new water treatment plant adjacent to the existing Dekeng WTP; (2) two additional units of rapid sand filters with new filter back washing facilities for the existing Dekeng WTP; (3) a new water reservoir; (4) new water distribution pipelines including new household connections; and (5) implementing a non-revenue water (NRW) reduction program.

A brief assessment outcome is provided below:

Criteria	Justification	Score
Economic		
Direct job creation	Limited impact on direct job creation as the construction and maintenance of the sanitation facilities only require a small group of technicians	0.2
Number of direct beneficiaries	Percentage of the population that will benefit directly from the project	0.04
Change in direct government net revenue	The planned number of connections and willingness to pay connection fees and tariffs are largely based on the PDAMs experiences, waiting lists and surveys they have conducted over the years.	0.8
Social		

Accessibility to social services	All project area now has access to water.	1
Attitude towards policy/project	Almost all respondents in Bogor (97%) expressed that they are satisfied with the PDAM's water supply services. In Kapuas and Muara Enim, the percentages are lower at 81% and 75%, respectively.	0.84
Evictions, demolitions and resettlements of people	The project consisted of works with small reversible and easily manageable involuntary resettlements impacts that were limited mostly to the construction phase.	-0.1
Liveability level	The project has contributed to improving the quality of life of residents in Bogor by increasing access to water supply services.	1
Community and stakeholder engagement	Results of social benefit survey revealed that there is generally positive perception on the impact of the project to the communities.	1
Access for women and the disabled	Women are also perceived to have benefited the most from water supply improvements as reported by 88% of the respondents because direct access to water supply helps them in doing households chores.	0.88
The poor's access to human, social, and financial assets	Overall, 74% of households reported improvement in service delivery in the three areas. A majority of survey respondents stated that there was improvement in the services provided by the water utilities in the last three years of the project. The highest was given in Bogor (99.6 percent), followed by Kuala Kapuas (92%) and Muara Enim (85%).	0.92
Environmental		
Air quality	Temporary disturbance on noise and air quality during the construction period.	-0.1
Water quality	Positive health and environmental benefits to the proposed areas through the supply of clean water.	1
Greenhouse gas emissions	n/a	0
Energy efficiency or green energy	n/a	0
Contamination of land	the landslides caused by heavy downpour at the new water sources of Bogor	-0.1
Vulnerability to climate change and other disasters	No works would be undertaken that could affect protected or vulnerable ecosystems.	0
Availability of (greenfield) land	n/a	0
Reputation		
Position the city/country as a good place to live, visit, and invest	The project will have a positive impact on the living standards and encourage investment. But, it might have a slight impact in the tourism sector.	0.8
Create visual architecture or unique scenic-landscape	n/a	0
Attract mega-events	n/a	0

There were two strategic benefits of this project. One was the rejuvenation of the city by virtue of the improved quality of water source in Bogor. Another benefit was the establishment of a flexible framework where PDAMs with various degrees of technical, managerial and financial strength - with the support of the local and central governments - could become sustainable entities capable of improving and expanding service delivery.

SUM UP AND COMPARISON

The team assigned equal weight to all core criteria belonging to the same impact dimension and came up with the weighted average scores of economic, social, environmental, and reputation impacts for each project. A summary of the final scores and strategic considerations can be found in Box 14. Based on the simulation, the power transmission project in Jakarta has the greatest economic impact in terms of beneficiaries and stimulating electricity consumption. The green transport project in Ho Chi Minh City is more environmentally friendly relatively to the other projects because it effectively eases traffic congestion, encourages citizens to adopt an environmental way for commuting, and brings about the improvements in air quality. The two sanitation projects in Ho Chi Minh City and Bogor, though implemented in two different type of cities, have relatively higher social impact compared to other dimensions. This can be explained by the improved health prospects due to the project, the project's participatory engagement approach, and the distribution of social benefits to communities.

In summary, we observed two general patterns from the simulation results. First, while projects in different sectors displayed a variety of outcomes alongside the impact dimension, projects from the same sector appeared to have similar scores at least in the most relevant dimensions as shown by the very similar score characteristics of two projects, the Ho Chi Minh City Environmental Sanitation Project and Bogor Urban Water Supply and Sanitation Project. Second, the type or size of the city did not dictate dimensional impact, as, for example, the Jakarta Second Power Transmission Development Project scores high (0.6) on the economic dimension, while the Jakarta National Slum Upgrading Project scores 0.13.

Box 14

SUMMARY OF MOCK-UP RESULTS

	Jakarta Second Power Transmission Development Project	Jakarta National Slum Upgrading Project	HCMC Green Transport Development	HCMC Environmental Sanitation Project	Bogor Urban Water Supply and Sanitation Project
Economic	0.60	0.13	0.32	0.18	0.35
Social	0.49	0.57	0.37	0.61	0.79
Environmental	-0.03	-0.07	0.16	0.06	0.11
Reputational	0.27	0.17	0.67	0.60	0.27
Average Score	0.33	0.20	0.38	0.36	0.38
Strategic Consideration	Energy connectivity	City rejuvenation; Institutional dissemination	Sustainable growth; Smart city integration,	Sustainable disposal of water; Urban rejuvenation	Sustainable utility capacity building (PDAM)

Closing

LESSONS LEARNT

The team was able to successfully apply the framework through simulations of past projects; although more refinement to the framework will engender more accurate evaluation results. The following section addresses several areas that require refinement and also challenges that the team faced during the simulation phase.

Soundness of criteria

First of all, the difficulty in obtaining desired data renders the exhaustion of criteria almost impossible. As appraisals are usually done before a project commences, the data relevant to a criterion is might be either unobtainable or, even when obtained, inaccurate. The time and effort spent on data acquisition also increase the cost of assessment. For the sake of practicality, it was suggested by several interviewees that we retain only essential and workable criteria while ascribing the rest to non-core criteria. Our first attempt of streamlining resulted in 20 core criteria, but the inquiry about essentiality as well as workability is an iterative process, calling for continuous refinement and redefinition.

Secondly, the requirement of exclusivity made complicated by the latent inter-criterion correlations, which may undermine the internal validity of assessment. That being said, in the absence of a statistic test, the criteria which seem to be exclusive from each other might indeed have strong correlations. Such possibility of correlation at best obscures the qualification process. At worst, it discredits final outcomes. For instance, we defined two important criteria for social impact: “accessibility to social services” and “attitudes towards policy/project”. These two criteria capture a factual benefit and subjective personal satisfaction respectively. Nevertheless, the latter criterion seems to be significantly susceptible to the former one, because logically people hold a positive attitude towards a particular policy which improves their accessibility to social service. Therefore, grading two inter-correlated criteria simultaneously could lead to impact overestimation, positively or negatively. Examples such as these pervade the whole spectrum of criteria, even for those belonging to different dimensions. Such risk demands efforts to redefine the criteria and to rethink innovative measurement method.

Last but not least, the inclusion of strategic considerations is not devoid of the effect from baseline assessment. That said, strategic aspects such as sustainability, rejuvenation and connectivity could always find their roots in dimensional impact. A green transport project can rejuvenate the city because it effectively eases traffic congestion, encourages citizens to adopt an environmental way for commuting, and brings about the improvement in air quality. Though the intention of

separating strategic consideration from the scorecard is to highlight some synergetic and sustainable potential of a project, the line between them remains blurred and requires decision makers to bear in mind the latent overstated impact.

Objectivity of measurement

Impact assessment, in its essence, is an activity of judgement based on observable facts and personal experience. A structural framework and grading guidance could help allay hasty and arbitrary judgement, but could never eliminate the subjectivity inherent in the outcome. The practice of simulation also exposed such issue of subjectivity when it comes to qualitative grading, to the dynamics of impact, and to the counter-effect due to mitigation initiatives.

Qualification is a preferable approach to conduct a beforehand impact assessment, in light of the data availability and the difficulty in designing an appropriate indicator. Even though the World Bank has defined some KPIs and quantitative targets for a project, they mainly serve to trace the progress and are subject to circumstantial demand. Thus, their roles in the impact assessment are limited. On the other hand, over-reliance on qualitative method could engender subjective and manipulative results. For example, water quality is an essential criterion in gauging environmental impact. In the absence of reliable indicators and data, an inference based on project plans renders no significant difference between normalised score, say, 0.5 and 0.8, insofar as a justification is provided. We shall not overlook the "snowball effect" when such discretion permeates the practice. A prudent way to address this issue is to develop operational guidelines, invite multiple specialists to undertake the judgement, and synthesise their inputs in the end.

The second issue involves the dynamics of impact over the project lifecycle. Such dynamics are at least threefold. The most obvious one is the changing of direct impact over time. For instance, the BRT project can help ease the congestion and improve the Ho Chi Minh City's air quality in HCMC, but such impact is incremental rather than mutational. It may well be that traffic congestion even worsened at the beginning because one lane of the street is used by the bus exclusively, leaving smaller room to other vehicles. But as the BRT network becomes more comprehensive and more people get accustomed to the new way of transportation, the traffic situation would become better. How to capture this kind of dynamics in the scorecard remains an open debate. A possible solution is to provide some scenario-based qualitative and descriptive projection alongside the grading.

Another dynamic is the development stage of the city could also affect the degree of impact over time. Urbanisation, demographical change, and institutional reform all can reshape the urban context, based on which the impact of a project may change significantly. For example, a surge of migrant workers in the city could overburden existing sanitation facilities, and render the intended impact of a sanitation project fruitless. Therefore, assessors should always take into account such city dynamics when drafting the impact scorecard.

The third type of dynamic has to do with other ongoing projects. Difficult to prescribe, there is always the possibility that an ongoing project might facilitate or obstruct the intended

consequence of the project that we are assessing. This adds another layer of interaction as well as complexity.

The last issue is about the mitigation plan and its effect on the overall impact. For most projects, the World Bank has developed an Environmental Management Plan (EMP). In addition to the identification of potential environmental or social impact from a particular project, the EMP also prescribes a set of mitigation initiatives to aid these potential hazards. The prescription of mitigation plan raises two issues to our measurement. First, whether or not the mitigation will be duly implemented? Second, if it is implemented, how to reflect the mitigation effect on the grading practice? One solution could be that for each criterion that involves mitigation plan, there will be one score denoting the original impact and a second score denoting the mitigation effect.

Reliable comparison

If measurement enables a less subjective qualification of impact, comparison paves the way to a rational prioritisation. The comparison method we proposed here involves the averaging of the normalised score of each criterion, and the inclusion of strategic considerations as a supplement input. Two challenges surfaced in the process of averaging.

First, should we separate the impact in construction period from the one in operation period? If we do, how to assign weights to each period? It is widely agreed that operational impact should outweigh the impact during construction phase, but to what degree? 95:5 could be an expedient alternative. However, there are two issues here which are important but due to time constraint we cannot properly address them. First, is the “operational impact” related to the actual costs of the project and the second one is the discount rate for comparing outcomes in different time periods.

In conclusion, the above discussion reflects the difficulties we encountered during the mock-up and our response to these problems. In terms of criteria development, it is rather impossible to define an exhaustive list due to the practicality consideration, and we acknowledged our limitation in addressing the overlapping and correlation issues, which called for criteria. In terms of measurement, we pointed out the issue of subjectivity in the judgement, and the overlooking of project dynamics as well as mitigation effect. With much research and development to be done, we consolidated some caveats and proposals here for the sake of future improvement.

NOTE TO AIIB

What AIIB might find helpful beyond the scope of work

The team's field visit in May yields some additional findings that are not fully related to the tasks given by AIIB. Yet, the team believes that such insights are useful and should be relayed to AIIB.

- **Differentiation.** A number of interviewees in Indonesia, Singapore, and Vietnam believe that as a new bank, AIIB has the chance to differentiate itself among other development finance institutions. They recognise some claim that AIIB is aiming to do so, yet as one interviewee put it, at present, *"AIIB claims that it would like to be an Uber, yet it looks just like another taxi company."* Many have not seen a clear direction from AIIB—not only whether AIIB really aims to be different, but also in regards to the type of project that AIIB is interested in. Many believes that the type of project that AIIB choose will signal stakeholders in infrastructure development community on how and when to approach the bank.

- **Loan ceiling and floor.** There were numerous enquiries to the team, asking if the team know AIIB's floor and ceiling for loans.

- **Local presence.** There were repeat enquiries regarding AIIB's stance on setting up regional or country representatives. While they recognise AIIB's principle to be a lean bank, they question whether that also means that all AIIB works will be solely in Beijing. There are indeed benefits of having local presence, such as relationship building, insights gathering, and business intelligence. The bottom line is not about which model that AIIB would use, but more on greater clarity regarding how AIIB would like to operate.

- **Chance to reposition.** Hearing the AIIB brand, some interviewees readily associate the bank with China and their experience with Chinese participation in infrastructure development in respective country. However, all agree that as a new bank, AIIB not only has a chance, but also the right to reposition itself in regards to Chinese influence.

- **Technical assistance.** Just like what is outlined in the Bogor case study, a lot of interviewees still believe that technical assistance is another key differentiator between development finance institution and other type of financiers. In addition, the team has also heard enquiries regarding a more coordinated and comprehensive assistance.

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Appendix

APPENDIX A: CORE CRITERIA AND THEIR DESCRIPTIONS

There are 20 core criteria within the proposed framework. These are criteria that the team believed can be assessed for all type of urban infrastructure projects in a consistent manner, given overall resource and time constraints.

Economic: three core criteria

- **Direct job creation.** Considering that most developing countries face unemployment and unformal employment problems, infrastructure projects represent an opportunity to overcome or minimise this issue. Infrastructure projects create jobs at diverse stages, such as during construction, operational and maintenance phases.

- **Number of direct beneficiaries.** The number of direct beneficiaries is a measure of the extension of infrastructure projects' direct impact over the communities where they are implemented. It captures the first and most direct impact of projects over communities.

- **Change in direct government net revenue**. Public fiscal conditions in developing countries are usually fragile and need improvement in order to provide additional means for local governments to allow effective public policies promotion. This criterion measures direct net revenue stream generated by the project, which includes taxation, captures another layer of benefits that potentially touches the entire community where the project is implemented.

Social: seven core criteria

- **Accessibility to social services.** This criterion measures whether the project improves accessibility to social services such as hospital or health centres, housing, school and government offices (U.S. Department of Commerce 1994). Measuring hospital density or number of hospitals per 1,000 people is one way to capture increased accessibility and social inclusion. If the result of this criterion turned out to be negative, the project would need a mitigation plan to avoid adverse social impacts.

- **Attitudes towards policy/project.** Attitudes formed by communities of the impacted region about the project cannot be underestimated. Complete information about the proposed project/policy, as well as information on estimated economic and social impacts are crucial for communities' acceptance and to ensure effective operations.

- **Evictions, demolitions and resettlements of people**. Whether or not a project requires evictions, demolitions and resettlements of households, affects the overall social impact (World Bank 2008). The higher the score of this criteria, which can be measured, for instance, by the size of the population affected, the more adequate policy and purposive implementation are necessary to minimise and reverse negative effects of involuntary resettlements.

- **Liveability level**. This criterion measures whether the infrastructure project would contribute to increase the quality living of urban population. The liveability level in impacted regions must be weighed against the increased urban sprawl that is associated with increased traffic and pollution.

- **Community and stakeholder engagement**. Measuring the degree of intensity of community and stakeholder engagement during project planning and prior to implementation is crucial for any urban infrastructure project. This criterion addresses the degree of influence stakeholders are likely to have on the project; specific urban issues to social sub-groups (e.g. ethnic minorities, the extremely poor, indigenous peoples) that should be addressed; whether the project threatens the interests (actual or perceived) of certain stakeholders and how the project can minimise or avoid potential conflict of interests and promote social cohesion (World Bank 2008).

- **Access for women, youth and the disabled**. This criterion measures to what extent the project incorporates features to increase access for women, youth and the disabled. It might turn out negative, for example, if a certain infrastructure project triggers women withdrawing from the labour market after subsidised childcare facilities are closed or if the project induces women and youth to commute longer distances for safety reasons.

- **The poor's access to human, social, financial and natural assets**. Given the assumption mentioned above that infrastructure is a key element of poverty alleviation, this criterion measures the percentage of poor people out of the number of total beneficiaries within the project area that benefit from increased access to human, social, financial and natural assets (Pouliquen 2000).

Environmental: seven core criteria

- **Air pollution.** Air pollution is associated with a number of respiratory and heart problems, and increases the risk of cancer. It is also linked to problems of prenatal growth and human development (Schell et al. 2006). Projects that help to reduce (physical) air pollution will therefore have a positive environmental impact, while projects that contribute to the pollution of air, e.g. by creating dust or smoke during construction and operation phase, have a negative impact.

- **Greenhouse gas emissions.** Greenhouse gases are the number one driver of climate change and global warming. They are therefore at the heart of the international climate agreement that was adopted at the UNFCCC Conference in Paris in December 2015. To support the COP21 process, countries publicly outlined their envisaged post-2020 climate actions, which are known as their "Intended Nationally Determined Contributions" (INDCs). The extent to which a project contributes to the fulfilment of these INDCs is a key indicator to assess the environmental impact of a project.

- **Energy efficiency or green energy.** Increasing the share of renewable energies in the total energy mix of a country or improving the energy efficiency of existing projects can make an important contribution towards more sustainable energy consumption. If a project positively influences energy efficiency or the availability of green energy, it will receive a positive score on this environmental impact dimension.

- **Contamination of land.** Land pollution refers to the degradation or destruction of earth's surface and soil, lessening the quality and/or productivity of the land as an ideal place for agriculture, forestation, and construction, for instance (Rinkesh 2013). It can be a direct or indirect effect of urban infrastructure projects, and their construction, operation,

and maintenance. The change in the level of pollutants and the area of land polluted are important indicators to assess the environmental impact of urban infrastructure projects.

- **Vulnerability to climate change and other disasters.** The social and economic losses due to disaster such as floods and windstorms continue to mount around the world. Infrastructure can play an important role in reducing the vulnerability of communities to these effects of climate change and other, man-made disasters. To assess the extent to which infrastructure is vulnerable to climate change and other disasters, or the extent to which it contributes to the mitigation of these risks, experts use indicator-based vulnerability models such as the Sydney Environmental Vulnerability Assessment (SEVA) framework (Tonmoy and El-Zein 2013, Tonmoy et al. 2012).

- **Availability of (greenfield) land.** Greenfield sites are areas of land, usually agricultural or amenity land, which are being considered for urban development (Murray-White 2017). Due to a limited amount of physical space available, infrastructure projects tend to reduce the availability of (greenfield) land. This can have negative effects on the environment, by destroying the natural habitat of animals and plant species, but also poses a problem by simply reducing future options: Once land has been converted to development, it is unlikely to ever be converted back to greenfield use.

- **Water quality.** Water is essential to human life and the health of the environment. It comprises marine, marine, estuarine, freshwater (river and lakes) and groundwater environments that stretch across coastal and inland areas (Office of Environment & Heritage 2015). Water quality is commonly defined by its physical, chemical, biological and aesthetic (appearance and smell) characteristics. It is managed and assessed in terms of indicators for levels of bacteria. Water quality is closely linked to the surrounding environment and land use. If a project is located in a physical water-risk area as defined by the Aqueduct Water Risk Atlas (WRI 2013), for instance, it is estimated to have a negative impact on the environmental dimension.

Reputation: three core criteria

- **Position the city/country as a good place to live, visit, and invest.** Projects that score high in this criterion are the ones which boost investment and increase liveability and tourism activities.

- **Attract mega-events.** This criterion assesses to what degree a certain infrastructure project contributes to attracting mega-events in a certain city/country. It has been proven that mega-event like the Olympics or World Cup with well-thought-out supporting infrastructure has long-lasting economic, demographic, and social implications for the entire region (PwC 2011). Determining the legacy of supporting infrastructure that can have ripple effect on the development of a region depends a lot on how a government body—national, regional, or municipal—plans ahead for the future.

- **Create visual architecture/unique scenic-landscape.** A unique or pleasing visual architecture can add reputation value to a certain city/country. Iconic landmark such as the Shanghai Tower or iconic space such as the Beijing Olympics Stadium helped Shanghai and Beijing's image. Projects that would preserve scenic values of certain iconic landmark would also score relatively high. The measurement of this criterion is based mainly on expert judgment.

Dimension	Non-Core Criteria
Economic	Capacity to create or attract new business
	Secondary industry promotion and value creation
	Capacity to promote growth or expansion of current business
	Local Content (LC) policies
	Change in local population average income
	Change in supply chain security
	Change in time to import
	Change in cost to import
	Change in time to export
	Change in cost to export
	Time change in local industries supply chain
	Cost change in local industries supply chain
	Private-investment-friendly environment
	Technology transfer
	Change in indirect government revenue
Social	Physical mobility
	Perception of health and safety
	Influx and outflows of temporary workers
	Trust in institutions and government
	Access of service distribution to the poor and marginalised
	Affordable unit charges for utility access
Environmental	Deforestation
	Noise emission
	Light emission
	Electromagnetic emission
	Scenic value of landscape
	Cultural, architectural or archaelogical heritage
	Land erosion and degradation
	Hydrological changes
	Availability of non-renewable resources
	Urban sprawl
	Waste generation
	Water supply
	Impact on coastal and marine resources
Reputation	Foster civic pride and enthusiasm
	Celebrate and showcase existing strengths or heritage
	Fostering effective policy implementation

APPENDIX B: NON-CORE CRITERIA

In addition to the core criteria, the following is a list of non-core criteria currently proposed in the framework. Non-cores could be of relevance depending on the project, yet set aside as they may require additional data gathering efforts and/or statistical modelling.

As mentioned, non-core criteria can “graduate” to the core, depending on the sophistication of proposed projects or by making additional data generation a requirement for project applicants. For example, the non-core “affordable unit charges for utility access” within the social impact dimension can graduate to the core when assessors compare different utility infrastructure projects and have the respective data available for all projects. The criterion was initially categorised as non-core because it might not be relevant for all type of infrastructure projects. Essentially, assessors have the flexibility to include as many non-core criteria as possible as data availability allows to increase accuracy in comparing projects.

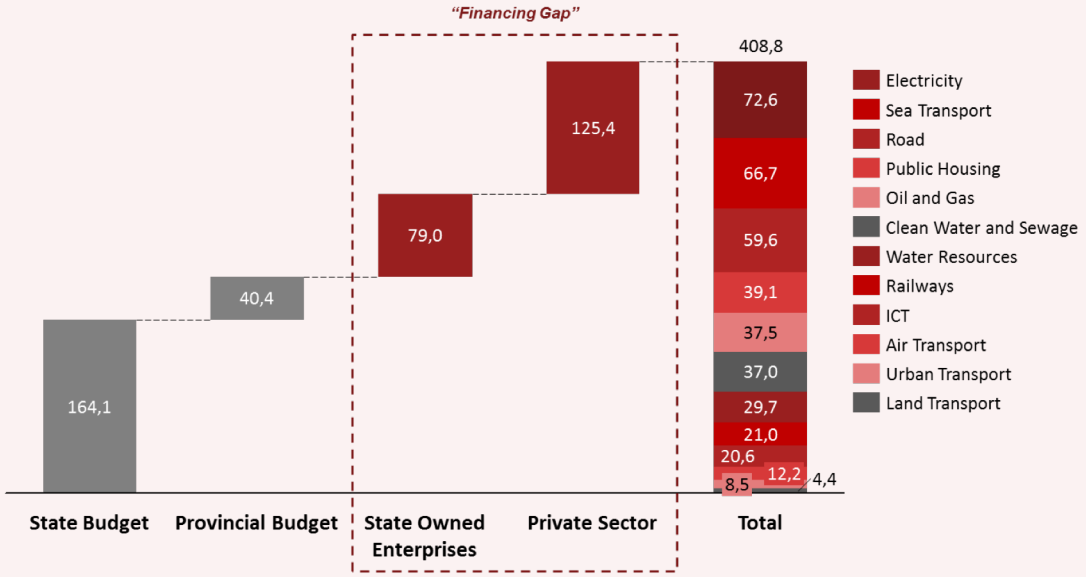
APPENDIX C: INFRASTRUCTURE INVESTMENT REQUIREMENT 2015-19

In Indonesia's 2015-19 development plan, BAPPENAS estimated that state and provincial budget will only be able to finance approximately half of infrastructure projects (by investment value).

INFRASTRUCTURE INVESTMENT REQUIREMENT 2015-2019

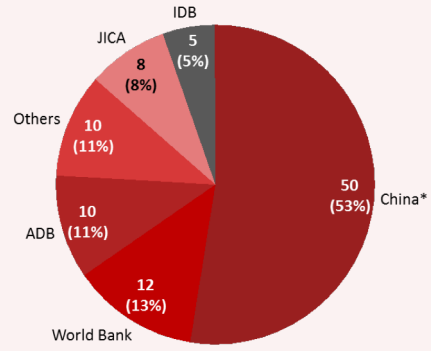
IN USD BILLION, USD 1 ≅ IDR 13,500

The government's five-year plan (RPJMN) is said to bear similarities with MP3EI of the previous administration, yet is more focused with 60% of the budget skewed towards energy, maritime, and roads.



Source: BAPPENAS, DBS

LOAN COMMITEMENT BY DFIS TO INDONESIA 2015-19 (IN USD BILLION)



Source: Tusk Advisory

APPENDIX D: LOAN COMMITMENT BY DFIS TO INDONESIA IN 2015-19

DFIs will continue to play their important functions in infrastructure sector in Indonesia—one avenue by making available of the capital for infrastructure development.

Shown in the exhibit is loan commitment by various DFIs to Indonesia within the year of 2015-19. China's commitment in the exhibit includes USD 10 billion for power sector and USD 40 billion via a fund focused on Indonesia and other Asian countries.

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