

Development of Intracity Transport in
Islamabad & Rawalpindi

Project Brief

Operation of Electric Buses on
PPP basis

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1. Introduction

Access to quality transport is among the key building blocks of a successful economy, as it allows mobility of people and resources thus facilitating and increasing economic activity. Improved access to transport can also facilitate better access to services such as health, education, and employment opportunities. Pakistan has generally suffered from insufficient and inadequate public transport, which is also deficient in terms of frequency of service, health and safety and sustainability.

Rapid population growth, particularly in the major towns and cities, has led to a sharp increase in demand for urban transport facilities and services. However, the following factors, inter alia, have hindered the adequate provision of public transport services to match the ever-increasing demand:

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- Densification and spatial expansion have occurred with little or no development planning;
- Weak governance structures have resulted in a significant wastage of resources and substandard quality of infrastructure; and
- High capital costs and the time required to develop high-capacity transit systems have prevented the timely implementation of such systems in rapidly growing urban areas.

Consequently, all the major cities in Pakistan (including Islamabad-Rawalpindi) are facing significant problems including serious congestion, air pollution from transport sources, high rates of traffic accidents and inadequate access to transport facilities especially by poor and vulnerable groups. All these factors are contributing to the deteriorating urban environment which, in turn, threatens the “livability” and productivity of many cities. The cities are largely served by unregulated and informal private operators, since there are no adequate regulations or an effective authority to oversee the urban transport system. Current Challenges in Urban Transportation

1. Growing Motorization

While the level of motorization in Pakistani cities is still much lower than levels in European cities, a trend of rapid motorization is evident in almost all of them. There has been a considerable increase in the motor vehicle populations of all major cities e.g., number of registered vehicles in Islamabad were nearly 1 million in 2019¹ compared with 700,000² less than 3 years prior. It is expected that Pakistani cities will continue to experience high rates of vehicle population growth, particularly for private vehicles, for many years to come.

2. Public transport

Public transportation has a very important role to play in urban transportation. In most cities of the country, the majority of the population, including the poor and other disadvantaged groups, are very heavily

dependent on public transportation. Compared with private cars, public transportation is more sustainable on economic, financial, social and environmental grounds. However, the failings of public transportation have become one of the major challenges faced by many cities. Dissatisfaction with the level and quality of public transportation services leads those people who can afford it, to turn to private modes of transport which adds to the levels of congestion. Another common problem in many cities is

¹ <https://www.thenews.com.pk/print/461256-registered-vehicles-in-ict-cross-over-979-398>

² <https://dailytimes.com.pk/65820/more-than-07-million-vehicles-registered-in-federal-capital/>

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that women, people with disabilities and other disadvantaged groups have poor access to public transport services and this severely restricts their mobility and access to education, services and jobs.

3. Congestion

Severe congestion is a common result of motorization in most cities of the country. The central parts of large cities are particularly congested, with weekday peak-hour traffic speeds averaging 10-20 km per hour or less. Delays due to congestion account for a significant proportion of the total trip time. The estimated social and economic cost of congestion could be enormous in addition to the cost of damage to the environment and human health.

4. Air pollution

Vehicular emissions have become a major source of air pollution in many cities. The poor air quality conditions prevail despite relatively low levels of motorization and vehicle use per person, by global standards. The existence of a large number of vehicles with poor emission control standards and the low quality of available fuel are the two primary reasons for this situation. In some cities, the prevalence of three-wheelers with two-stroke engines has further aggravated the situation. IQAir estimates Islamabad's air quality to be poor and is deemed unhealthy for sensitive groups and cites construction and vehicles as sources of pollution³.

5. Safety

Increase in motorization and limited public transport is also a source of accidents and safety concerns for daily commuters. Various studies indicate use of private vehicles instead of using public vehicles as indicators of higher rate of accidents. One such study found "Commuters cut crash risk by more than 90 percent when taking public transit instead of driving, and investment in transit may reduce a community's automobile crash risk in half" ⁴

Islamabad - Rawalpindi

³ [cities/rawalpindi-population](#)

⁴ <https://www.dawn.com/news/1504678>

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The Capital of Pakistan, Islamabad (ISB) together with its twin city of Rawalpindi (RWP), has a combined population of 3.44 million³. Public transport in Islamabad is mostly dominated by the private sector, which operates small wagons and minibuses in a largely unregulated and unmonitored environment. Islamabad has a high level of car ownership leading to congestion on some roads. A social survey conducted by the Asian Development Bank in 2012 found widespread public dissatisfaction (over 90%) with the existing public transport services, and high levels of support for improved, higher quality services. Women, the

³ <https://www.iqair.com/pakistan/islamabad>

⁴ <https://www.cnu.org/publicsquare/2016/09/14/study-big-safety-benefits-transit>

elderly and disadvantaged groups in particular highlight seat unavailability and being treated with disrespect by drivers and conductors. Over 75% of journeys by the occupants of low-income households are by public transport, underlining their reliance on this mode of transportation.

While, the relatively new metro bus service has provided some relief to commuters through a 22.5km long single route from Pakistan Secretariat, ISB, to Saddar, RWP, it is unable to cater to the needs of the population of the cities (the Metro bus project with its high capital and operating costs was initiated to cater for up to 150,000 passengers per day, but due to the high cost of operations and reduction in

standalone system and therefore needs integration with other modes of transportation e.g., a feeder bus network.

and expressed the willingness to pay more for such a premium service. This bodes well for a well-designed Bus System. It is on this basis, that the Islamabad Green Bus Service has been conceived.”

In order to mitigate the problem of inadequate public transportation in ISB and RWP, a proposal has been put forward for the introduction of electric buses on a public private partnership basis as one of the means to address the public transport issue (“Project”). Additionally, such a service may have a multitude of additional benefits, such as reduction in pollution, reduction in road accidents, provision of jobs and aligns with the environmental vision of the current Government of Pakistan⁵.

subsidies, it caters to no more than 100,000 commuters per day⁴). In addition, the Metro bus service is a

According to the concept note submitted by the Capital Development Authority, “the level of demand in Islamabad suggests solid market potential for a well -designed and properly managed urban transport network. In fact, respondents of a recent survey overwhelmingly support the concept of quality service

⁵ <https://www.dawn.com/news/1634036>
<https://worldpopulationreview.com/world-cities/islamabad-population> <https://worldpopulationreview.com/world->

2. Institutional Capability & Preparedness

2.1 Institutional mandate to proceed with the project

There is considerable ambiguity on the future processes with regards to the Project, mainly with respect to the responsibility of the implementing agency. In 2017 the Federal Government had initially approved a proposal to set-up a Capital Mass Transit Authority (CMTA) for the purpose of overseeing the Metro Bus Project, which included the Faizabad to New Islamabad International Airport⁶. However, the Federal Government only approved the formation of the Capital Mass Transit Authority later in 2020, extending its scope to oversee the development of a mass transit system in the Islamabad Capital Territory⁷.

Under the Capital Mass Transit Authority Ordinance 2020, the CMTA was envisaged to have the right for construction, operation, maintenance, and management of the mass transit system in Islamabad. CMTA was also envisaged as having the responsibility to give licenses to Service Providers for provision of various services to CMTA including mass transit vehicle operators, along with any other kind of services that are

⁶ <https://tribune.com.pk/story/1577862/pm-approves-proposal-set-capital-mass-transit-authority>

⁷ <https://www.zameen.com/news/establishment-capital-mass-transit-authority-approved.html>

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required for the smooth functioning of the mass transit system. CMTA was also envisaged to have the authority to establish a fund to cover its general expenses of running the CMTA effectively.

However, thus far, there has not been any formal notification by the Federal Government to set up such an Authority and, as such, this is the first major impediment for the execution of this Project. Additionally, no further Rules or Regulations have been promulgated by the Federal Government which will also need to be developed on a fast-track basis for the CMTA to be effective in its tasks. This will be an important part of the regulatory review that will need to be undertaken for the Project.

In addition, an important consideration will be the future role of the existing Metro bus service and its operations in Islamabad under the envisaged CMTA. This aspect will need careful consideration in view of the involvement of the Punjab Government in the metro bus service.

2.2 Stage of project in terms of documentation and approvals

The Project is still in initial conceptualization stage. Some of the key steps to effectively execute the Project have been highlighted in section 8.2 of this document.

An Unsolicited Proposal has been received by the Capital Development Authority (CDA) from a private sector party (M/s Daewoo Express) for the development and operation of an E-bus system. However, it is important that such proposal is evaluated in the context of the overall transportation needs and operating environment. Some of these aspects are highlighted in section 7.0 of this document.

2.3 Project Budget and tentative financing plan

The financing plan for the Project should be derived from the commercial feasibility study and stakeholder consultations; especially financial institutions to get feedback on the level of financing that they would be willing to provide, and to get an idea about the possible requirements for any financial guarantees and collateral. Additionally, since this Project will have a strong sustainability component, has Multilateral Development Institutions (MDIs), bilaterals and green funds could be approached by the Government to

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seek potential grants and support that may be available to help implement the project. Some initial stakeholder feedback is discussed in section 5.2 of this document.

2.4 Project Execution Capability of the Implementing Agency

It is important that the CMTA is established as soon as possible, as the role of the CMTA remains one of the most critical components for the effective execution of the Project. Key factors to keep in mind for the CMTA to perform its duties as an effective Implementing Agency include:

1. Capacity and resources to manage such a project under the PPP modality.
2. Ensuring sufficient budget allocation and resources for overseeing the project during design, construction and operation phases.
3. Development of an urban transport master plan, keeping in view future needs along with a Project plan for the next stages with allocated timelines and responsibilities.
4. Ensure effective communication with relevant stakeholders.

3. Project Background

3.1 Development of Project Scope

A proper technical review of the Project needs to be undertaken, which should broadly cover the optimal routes for this Project to be undertaken, technology to be used, as well as associated costs and other ancillary requirements. These have been identified in section 4.1 of this document.

The Project should be divided into phases, whereby an initial “test” route can be started first to ensure that the technical solution is workable and implementable in the context of Pakistan, especially taking

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into account the provision of affordable electricity for charging stations and other costs moving forward and taking full advantage of the incentives provided in the Electric Vehicle Policy 2020-2025⁸. For e-buses specifically, the incentives include (i) imported parts at 1% custom duty, (ii) no registration fee or annual token tax and (iii) exemption from sales tax. Other general incentives for EVs include (i) incentivized power tariff on charging stations, (ii) exemptions from permit costs and (iii) bulk insurance at incentivized rates.

Previously the following routes were identified in a study conducted by Gaheez Consultants and funded by UNDP in 2016:

- Route 1: Rawat to Faisal Mosque via 9th Avenue.
- Route 2: Barakahu town to Daman-e-Koh Chowk, Margalla Road via 7th Avenue.
- Route 3: Pir-Wadahi Chowk to IJP Metro Station via IJP Road.
- Route 4: Nilore to Khanna Bridge via Islamabad Highway.
- Route 5: Taramari Chowk (Lathrar Road) to Aabpara via Park Road.
- Route 6: Golra Chowk to Metro Chaman Station via Kashmir Highway

However, considering the critical nature of this project and the fact that this study was undertaken 5 years ago, these routes should only be used as a starting point for discussion and analysis, as it will be important that the final routes take into consideration the needs of commuters. Also given that the above routes were identified in 2016, it will be important that new studies are undertaken to:

- Quantify the existing levels of supply and demand of Public Transport on the identified routes;
- Identify any bottlenecks and problems on identified routes and recommend alternative routes or other solutions; and
- Undertake a financial analysis for each route to determine its viability.

After the above studies are completed along with a commercial feasibility study, only then can a bankable transaction structure be developed. Lastly, the technical feasibility and subsequent commercial feasibility study will also need to assess the various technical options namely (i) conventional buses, (ii) e-buses, (iii) smaller bus feeder systems (to transport commuters to nearest larger transport systems) and (iv) BRT / light rail systems for improving public transportation in the identified corridors to determine whether ebuses are the best option.

Some of the key factors for analysis will include project costs, development of charging systems / availability of electricity, financing options including potential for green financing and MDI/bi-lateral support. Since the e-buses solution is the most optimal expected solution for the reduction of greenhouse gases, there should be an opportunity to generate potential support for green financing from various

⁸ <http://www.engineeringpakistan.com/wp-content/uploads/2020/08/EV-New-Tech-Policy-060420.pdf>

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Development Partners as well as those private sector organizations that are focusing on supporting green infrastructure. .

Based on the above analysis, as well as from feedback from market participants, an optimal transaction structure can be developed.

3.2 Strategic fit within sector and overall economy

The Project is a strong fit within the transportation sector for its obvious need, as well as for the incremental social, economic and environmental benefits that it will likely generate. The Prime Minister Imran Khan has been among the pioneers of environmentally friendly initiatives within the South Asian region, whereby the billion-tree tsunami project is hailed as a “true conservation success story”¹¹. The Federal Government has also recently shown willingness to undertake a project for the initiation and improvement of the mass transit system in twin cities, specifically based on Electric buses. An ambitious target of 38 operational electric buses by year end has been predicted by the current Government¹². Hence, it is vital to leverage all Government support to initiate CMTA on fast-track basis and aim to start this Project in the near term.

In Karachi, the Government of Sindh (GoS) in collaboration with BYD China has already launched the first e-buses prototype, which will soon turn into 10 electric buses running in Karachi⁹. This K-9 electric bus has the capacity to take 35 passengers per trip. Initially the GoS plans to run a fleet of 10 electric buses that shall operate from the Native Jetty Bridge to Sohrab Goth area of Karachi via MA Jinnah Road. Due to this existing precedence, the GoS is also one of the entities that may be approached by the CMTA for assistance and to understand lessons learnt for the execution of this Project.

There are various expected benefits of this Project to the economy and GDP of Pakistan, such as increased productivity of the labour force with easier access to their places of work, lower fuel costs and reduced fuel import budget for the Government, lower vehicle maintenance costs, , improvement in health and safety, and transfer of e-buses technology to Pakistan for future development works.

Lastly, this Project can offer immediate benefits in terms of reducing negative impact on the climate, as well as incremental benefits by changing perceptions and introducing this technology for wider application across the country. Thus, this Project is an ideal fit to explore green bonds and attract investors in the ESG space.

⁹ <https://gulfnews.com/world/asia/pakistan/pakistans-first-electric-public-bus-service-launched-in-karachi-1.78236076>

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¹¹ <https://www.voanews.com/south-central-asia/pakistan-plants-500-million-new-trees-drive-against-climate-change>

¹² <https://thefrontierpost.com/almost-38-electric-buses-to-hit-islamabad-roads-by-december-minister/>

3.3 Sectoral & Institutional Context

With the advent of the Pakistan Electric Vehicles Policy 2020-2025¹⁰, there are meaningful incentives being offered for the successful operation of Electric Vehicles in the country. The Government institutions seem to be forward looking and generally welcoming of electric vehicle projects in Pakistan, with the GoS already having initiated a project in this space and the Federal Government also welcoming future projects.

¹⁰ <http://www.engineeringpakistan.com/wp-content/uploads/2020/08/EV-New-Tech-Policy-060420.pdf>

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This can help the sector grow as the market has traditionally been dominated by three major assemblers, i.e., Suzuki Pakistan, Honda Atlas Cars Pakistan, and Toyota Indus Motor Company. However recently there has been an inflow of competitive vehicles with companies such as KIA motors via Lucky group and MG motors etc. providing tough competition to the big three, thus reducing the cartel monopoly structure that has existed for decades. The electric vehicle initiatives essentially provide even more competition to the existing vehicle manufacturers through privately owned electric vehicles. Additionally, with the initiation of this Project, the demand for vehicles will reduce incentivizing manufacturers to provide greater value for money to end users as well as reducing costs.

4. Project Viability Assessment

4.1 Technical review of project

A non-exhaustive list of concerns to keep in mind for the technical feasibility of the Project include:

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1. Review of the technical solution proposed: Assessment of various technical options namely (i) conventional buses, (ii) e-buses, (iii) smaller bus feeder systems and (iv) BRT / light rail systems. For e-buses to be the preferred option, economic and environmental benefits combined with the potential for grants should be key factors in determining whether it is the superior solution to other options, notably conventional bus network system.
2. Routes for E-buses; During the previous iteration of the Project 6 routes for e-buses were proposed. That will be a useful entry point when conducting the feasibility of the Project. However, additional routes or alternative routes must also be explored, keeping in mind the needs of commuters, incremental benefits to the economy and the willingness to pay of commuters
3. Upgradation of existing metro solution: Depending on key routes chosen as explained above, and whether CMTA is empowered to oversee the existing metro network, there may also be an opportunity to upgrade the existing Metro network, with the very least an increase in the number of buses to reduce crowding and oversubscription of the service while increasing daily commuters on existing routes.
4. Charging stations and associated electricity costs if e-buses solution is the preferred method.
5. The technical review will need to ensure availability of electricity by assessing the adequacy & reliability of grid, distribution network and grid energy mix. Ensuring availability of electricity is paramount for reduction in greenhouse gases as discussed in section 4.2 of this document.
6. Land acquisition requirement and other associated infrastructure needs such as any maintenance depots, safe parking areas for e-buses and bus stops in populated areas. This will especially need attention if continuation of the BRT (metro) system is the preferred solution as per feasibility.
7. Which buses to import, their other ancillary equipment and ongoing maintenance costs. Key factors to keep in mind include but are not limited to size of battery banks, life of battery banks and keeping these continuous expenses as cost effective as possible.
8. How to effectively utilize benefits provided by the Pakistan Electric Vehicle Policy 2020-2025, including reduced taxes during the investment period.
9. Cost of the project should be in-line with similar projects in Pakistan and other countries (China & India as starting points).

There is a possible additional concern which could have legal implications in addition to technical concerns. It needs to be determined that since portions of the Project fall outside the boundaries of Islamabad Capital Territory, what level of involvement shall be required from Rawalpindi Development Authority (RDA) or Regional Transport Authority Rawalpindi (RTA). This needs to be highlighted during the regulatory & legal review of the Project. Ideally for a Mass-Transit project which concerns the twin cities, CMTA and the relevant Authority from Punjab / Rawalpindi should work in close conjunction for development of this Project with CMTA leading the overall operations.

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4.2 Environmental & social review

Preliminary estimation suggests that this Project can be a net positive for the environment and reduce production of greenhouse gases. It will reduce pollution and the carbon footprint by running on electricity rather than the more damaging gasoline. It will also reduce the requirement of individual bikes, cars and existing private transport vehicle network. This project will also create jobs for the local populace of twin cities as drivers, maintenance crews and other ancillary service providers. Additionally, this project can be a source of important technology transfer to Pakistan, and future assembly / manufacturing could be shifted in Pakistan. This would result in multiple far-reaching benefits not only of improvement in manufacturing capacity and the economy, but also to raise the general standard of living and method to get more occupations for the labour force. Notwithstanding the above, an Environmental Impact Assessment (EIA), an Initial Environmental Analysis (IEE) and Initial Social Analysis (ISA) may be undertaken to identify potential red flags and key areas of concerns to consider before the detailed analysis is to be undertaken. Key concerns to consider include (i) estimation of social costs with respect to displacement of existing private wagon operators and (ii) assessment of reduction in vehicles on roads vs new commuters that previously did not have access to transport.

4.3 Commercial & financial analysis

The commercial analysis is generally undertaken from the perspective of the Government, with its focus on the provision of the best possible service on commercially viable terms. One of the methods used to ascertain commercial viability (cost-benefit approach) is through modelling of the Economic Internal Rate of Return (EIRR). The EIRR attempts to assess the incremental benefits of a project to the Government and whether the general populace can reap direct and indirect benefits of the project; therefore, it is prone to subjectivity. For this reason, the Government may adopt certain standardized benchmarks for its review of each project and put the EIRR calculation to a test. The EIRR attempts to quantify various incremental benefits such as:

1. Increased access of opportunities for the labour force – With easier access to workplaces, there can be a greater exchange of labour between the twin cities (and beyond) than previously, hence increasing overall GDP
2. Lower fuel costs – As this project comes to fruition, there will be lesser need for gasoline intensive vehicles such as bikes, automobiles, and inefficient existing private transport options. This will also help in reducing net fuel imports thus benefiting the Government and commuters alike
3. Reduced maintenance costs – There will be a reduction in vehicle maintenance expenses of the populace due to reduction in use of private vehicles resulting in monetary benefit to the end-users
4. Development of new e-industries – As the project comes into its operations phase, a greater emphasis will likely be put by Government players in the country to develop newer phases of the Project and to replicate this Project in other parts of the country. This will lead to technology

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transfer and increasing employment, as well as opening new e-industries such as manufacturing / assembly of E-buses, other electric vehicles, and associated products such as batteries

5. Reduction in Greenhouse gases – It will help reduce pollution and the carbon footprint, and lead to improvement in air quality by running on electricity rather than gasoline
6. Reduction in congestion – This Project will aid in reduction in severe congestion caused by excessive motorization in the twin cities. Reduction in road accidents – The Project is expected to reduce number of traffic accidents in the twin cities. Various studies have indicated reduction in road accidents with increased availability of public transportation.

The financial analysis will need to be refined constantly, starting from the pre-feasibility stage using rough numbers and timelines, up till the post-bidding stage when negotiations are ongoing with a potential concessionaire. In fact, bidders tend to review the performance of the models on a monthly basis with projections, and often revise the projections based on any changes in project dynamics or anticipated forecasts that come up during the construction or operations phase.

Project return measures such as Project NPV and Project IRR measure the overall benefit of the Project to both Equity and Debt investors, and the Equity NPV and Equity IRR measure the benefit of the Project specifically to the concessionaire. The Government's own feasibility studies should ensure that this number is in line with investor expectations as assessed during the market feedback stage of the Project.

The final feasibility studies by the Government need to be of very high quality to accurately assess key assumptions of the Project. These assumptions include all revenue sources, especially bus fares to be assessed through detailed technical study regarding number of travelers on key routes and their willingness to pay through a specific willingness-to-pay assessment which should eventually become part of the commercial feasibility study.

A key determinant for the e-buses project to succeed. includes whether the environmental, economic, and social benefits are sufficient to off-set the potentially higher cost of the e-buses solution compared with other solutions. Additionally, since the e-buses solution has the potential for grants and soft financing terms from MDIs/Bi-laterals and private sector financiers, the e-buses solution could be a superior financial solution compared with other transport solutions.

The Project cost, forecast of fares & commuter demand (hence revenues) and financing assumptions such as cost of debt, debt-to-equity ratios etc. must also be compared with PPP projects with similar risk profile and be supported by market sounding. After calculating the VfM and keeping all the of the above factors in mind, a financial viability assessment can be undertaken to assess whether the Project is financially feasible as-is, or whether it needs to be structured through a different or more innovative PPP methodology.

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4.4 PPP structuring options review

Non-PPP options include EPC and EPC + Financing modes. However, these are unable to effectively maximize private sector innovations and efficiencies or reduce costs to the public sector. Hence other modalities, specifically PPP options need to be explored for effective implementation of projects. Some of the key potential PPP options which have strong potential for private section participation for this Project include the following:

1. Design, Finance, Build, Operate and Transfer (DFBOT): DFBOT is a form of Build-Operate-Transfer (BOT) modality which is most utilized in Pakistan for PPP projects, and hence the local and foreign parties are already familiar with this modality. Under DFBOT, the Project is awarded to a concessionaire such that most of the transferable risk of the Project is transferred to the Private Party, and the Government is only responsible for the Retained Risks of the Project. The concessionaire may itself be the project operator or may outsource operations to a suitable operations expert.

There are also some additional costs to the Government in this model, such as additional oversight, transaction advisory and procurement costs, alongside any risk that is retained which was not transferred to the private party.

Post-award of the contract, the private party shall be responsible to design, build, finance and operate the project with minimal supervision from the Government. Depending on risk and return expectations, there may be components of revenue sharing in favour of the Government, or alternatively some form of monetary support to the Concessionaire in terms of a minimum revenue guarantee or Viability Gap Funding.

Under a DFBOT, the concessionaire will be given the right to charge tolls (fares) and this revenue will be used to repay interest and principal payments (debt payments), O&M costs, return on equity (to the private party) and any other costs necessary during the project such as periodic maintenance or battery change in the case of E-buses.

2. Build-Lease-Transfer (BLT): BLT or Annuity model is an alternative form of procurement whereby a private party develops the project on behalf of the public partner and then 'leases' the project back to the public partner for a predetermined concession period. The public partner then pays an availability payment to the private party. These availability payments are calculated as the net cost to the private parties. Availability payments traditionally encapsulate interest and principal payments (debt payments), O&M costs, return on equity (to the private party), taxes and any other costs necessary during the project such as periodic maintenance or battery change in the case of E-buses. At the end of the lease period, the private party transfers the ownership of the project to the public party.

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In this methodology there is lesser level of risk to the private party since the demand risk has been absorbed by the Government, and the private party is entitled to a guaranteed level of return. This modality should only be undertaken by the Government if other options are not viable due to lack of interest of the private sector, or difficulty in determining cash flows (demand and revenues) during the project lifecycle.

3. Operations & Maintenance (O&M): An O&M contract is the simplest form of contract, where an asset is already in existence and expertise of a specialist maintenance operator is required only for running day-to-day operations of the project. The private party is not responsible for the upkeep of infrastructure and is usually promised a fixed fee. To incentivize performance, the returns of the private party may be increased by some percentage depending on performance greater than benchmark Key Performance Indicators (KPIs), and in case of underperformance, the private party may be charged a penalty.

The key challenges in this approach are bifurcating the level of responsibility of the private and public sector, especially when periods of periodic maintenance arise. Additionally, the responsibility of maintaining the quality and any future procurement / construction of buses and associated

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Under this PPP modality, the Government will also need to undertake all of the capital costs to set up the project, which is not recommended. The significant advantage of the other two PPP modalities, is to transfer the construction and financing risks and responsibilities to the private party.

A comparison of key features of the three main modalities has been illustrated below:

Modality	DFBOT	BLT	O&M	Remark
Raising Financing	●	●	●	Responsibility of Govt in O&M model
Construction & Procurement	●	●	●	Responsibility of Govt in O&M model
Time to completion / efficiency	●	●	●	Responsibility of Govt in O&M model
Innovative solution and design	●	●	●	DFBOT sufficiently transfers responsibility on private party
Return potential to private sector	●	●	●	Safest in BLT since it's guaranteed
Ease of implementation	●	●	●	No complex concession agreements in O&M
Interest from private sector	●	●	●	BLT is safest structure for private parties
Risks for Government	●	●	●	Majority risks transferred to Govt in BLT

Note: color code implies key areas of success for the project; e.g. , greater probability of lower time to completion / higher efficiency in DFBOT / BLT compared with O&M since responsibility is on the private party rather than the Government

There are multiple other forms of PPP modalities not discussed above, such as Build-own-operate (BOO), Build-own-operate-transfer (BOOT) etc., but these are all closely linked with one or more of the modalities discussed above. Only those modalities most potentially relevant to this Project have been highlighted in this section.

4.5 Evaluation of financing structure & Govt. contribution

While there can be multiple options under the PPP modality (identified in section 4.4) these need to be evaluated further in a comprehensive commercial feasibility study and subsequently evaluated to estimate the total requirement of Government contribution and the total liability to the exchequer.

infrastructure lies solely with the Government, which may not necessarily be best suited to ensure its upkeep.

Based on the transaction structure finalized, it is usually in the best interests of the Government to have a higher debt component in case of BLT / Annuity structures, since both the overall cost and the timeline of debt component is lower compared with the equity component.

In other structures where demand risk is with the private party, an optimal funding structure needs to be estimated to ensure that the risk and return metrics of the concessionaire as well as the banks are fully met.

5. Market Sounding

5.1 Identifying market participants

There are five key categories of market participants that need to be approached by the Government for this project. These can broadly be defined as follows:

1. Developers

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Some of the large-scale developers will need to be approached who are leaders in the electric vehicle space, or who have shown potential for equity investment in Pakistan or the electric transport space. This list should ideally include a mix of international experienced players as well as tech-oriented local players. Among local players Daewoo Express has already provided an unsolicited proposal to the Government, and other players such as the Chinese company Skywell and Swedish Company Hitachi ABB power grids also seem interested, as they have signed an MoU with Daewoo¹¹.

Generally, China has dominated the world in terms of shifting its public transport needs to electric buses rather than traditional buses, hence Chinese developers such as BYD China or Ankai should ideally be approached on a priority basis.

2. Operators

Often developers are also the operators of a PPP project, however this may not always be the case. If a large developer experienced in PPPs is interested in this Project but does not have the operating capacity to undertake this Project effectively, then they may alternatively outsource day-to-day operations to an experienced international electric bus operator or local traditional bus operator. Some of the Chinese bus operators include Beijing Public Transport (Group) Co. Ltd., Guangzhou Public Transport Group Co., Ltd, Shanghai Bashi Public Transportation Group Co. Ltd. and Tianjin Public Transportation Group (Holding) Co. Ltd. Local large inter-city bus operators other than Daewoo express include Bilal travels, Faisal movers and Niazi express.

3. Private Sector Financiers

Depending on the project costs, local or foreign banks / financial institutions should be approached for this Project. If the feasibility studies showcase a project cost that is higher than previously undertaken in the country on a PPP basis, then foreign financiers will certainly have to be approached due to the lower ticket size (liquidity) of local financiers. Additionally, many foreign banks such as JP Morgan, HSBC, ICBC and ANZ have prioritized investment in the Environmental Social Governance (ESG) space; In fact, Asia has seen the largest rise in bank debt issuance in ESG focused companies by 3 times since 2020, up to \$106BN in 2021 from \$35.3 in the previous year¹².

Other than commercial foreign financiers, those from sustainability and responsible investing space including sustainable financing (sustainability linked bonds / loans and green bonds) could be

approached as part of market sounding for the Project. Additionally, climate finance sources such as climate funds could be included in the discussion.

¹¹ <https://www.thenews.com.pk/print/795882-mou-on-introducing-electric-buses-other-vehicles-in-pakistan-signed>

¹² <https://www.bloomberg.com/news/articles/2021-07-26/boom-in-esg-finance-creates-one-of-asia-s-hottest-job-markets>

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Additionally, tier 1 and some tier 2 local banks must also be approached to assess their appetite for investment in this space and to understand their key concerns, especially regarding collateral or securities to be provided by the Government. Banks with the largest potential ticket size include Habib Bank Limited (HBL), National Bank of Pakistan, Meezan Bank, Bank Alfalah, MCB Bank and United Bank Limited

4. Multilaterals Development Agencies (MDIs) or other Bilateral Agencies

The MDIs should be approached to assess whether this Project is potentially eligible for any grants, support, or low interest loans. These MDIs/bilaterals include the World Bank Group (WBG), Asian Development Bank (ADB), AIIB and Islamic Development Bank, among others. The various types of support available are explained in section 8.2 of this document.

Furthermore, in addition to MDIs, regional and international DFIs can also be approached for widening financing sources. Among local entities in Pakistan, Karandaaz is a DFID and Bill & Melinda Gates foundation funded entity that provides grants for projects that have a net social benefit to the population. They have also provided financing for the newly developed InfraZamin, an infrastructure fund based in Pakistan. InfraZamin can issue credit guarantees for infrastructure-related debt instruments and attract private capital for investments in infrastructure space. Other potential DFIs, include KEXIM and JICA

5. Government agencies with prior experience and key stakeholder agencies

The GoS has already initiated an Electric buses project that is up and running in Karachi with a prototype bus built in collaboration with BYD China. As an ambitious target, the GoS aims to expand this to possibly 100 buses by the end of the year. The CMTA / P3A should ideally include conversations with the GoS to discuss some of the challenges and pitfalls faced during the initiation of this project, as well as their strategy to deal with multiple issues expected to arise in the future.

To ensure there is adequate supply of electricity as well as land availability for depots & charge stations, some discussions with IESCO and CDA should also take place to ensure key stakeholders are involved from the start of the process. These are some key challenges that have already been faced in Latin American countries in similar projects.

5.2 Market Feedback on Project Financing Structures

The private sector generally prefers options with the least risk transferred to them, while the public sector ideally wants to transfer as much risk as possible to the private sector without compromising the service quality and ensuring that the VfM is positive. This risk analysis/VfM assessment should be undertaken by the CMTA once it has been incorporated and it should discuss the project dynamics in detail with at least the five types of stakeholders identified in section 5.1 of this document.

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Some of the key metrics to be discussed with stakeholders during this stage include but are not limited to:

1. Required returns to investors including Project NPV, Project IRR, Equity NPV, Equity IRR and payback periods.
2. Security structure & collateralization, and credit enhancement requirements.
3. Average ticket size and maturity of domestic debt as well as average cost and maturity of foreign debt.
4. Environmental & Social standards expected by international investors.
5. Transaction structures as discussed in section 4.4 of this document, and alternatives to be proposed by private parties.
6. Acceptability of the project cost, as well as associated funding required.
7. Debt to equity ratios which are acceptable to both local banks and international financiers.
8. Capability of the private sector to undertake such a project.
9. Acceptable ratios to lenders such as DSCR, PLCR and current ratio.
10. List of possible grants, which ideally could be up part of the transaction structure during the bidding stage.

Initial Feedback received from consultation with some private sector participants such as UBL, NBP and HBL reveals that to ensure success of the e-buses project on PPP mode, some key aspects that would provide comfort to lenders and private party include the following:

Reputation of concessionaire: Initial market sounding reveals that there are many reputable local entities that have not stepped into PPP space but if they do show interest in this Project, lenders would have a much higher desirability to participate in the Project. Some such potential entities include Lucky Group, Engro Corporation and Gul Ahmed etc.

Government Support and Incentives: In the case that this Project does not have the level of demand as envisioned in the traffic study and base case, government support mechanisms may be required to make the Project viable.

Availability of Electricity Supply: Supply of affordable electricity would be a crucial element for the success of the Project. This could be achieved either through direct electricity agreement with IESCO or alternatively through other dedicated sources such a development of solar parks (for which land would be required).

Effective transaction structure and quality of feasibility: The transaction to be structured will need to provide reasonable level of returns to the investors with adequate cash flows / future prospects, and the analysis will need to be based on a quality commercial feasibility study. The transaction structure will need to be bankable with adequate collateral, insurances, or financial instruments to back-stop the return of investment in case of material deviations from forecasts.

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6. Risk Assessment

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6.1 Roles and responsibilities of public and private parties

Role	Responsibility		
	Public	Private	Hybrid
Transaction structuring & bidding process	✓		
Feedback from private parties	✓		
Land Acquisition	✓		
Design & Construction of, charging stations and other required infrastructure		✓	
Procurement of Electric buses, charging stations, batteries, and any other associated equipment		✓	
Operation and Maintenance		✓	
Financing and achievement of Financial close		✓	
VGF during construction or operations of the project	✓		
Grants from Multilaterals and Government			✓
Provision of financing instruments to financial institutions			✓

6.2 Risk identification and risk allocation matrix

Sr. No	RISK	Description	Allocation			Likelihood
			Public	Private	Hybrid	
1	Site Risk / Right-of-way	Project land will be unavailable, or unable to be used at the required time, or in the manner or the cost anticipated. Unless there are dedicated routes envisioned for this service, this risk shall be low. However, the Government will need to ensure that there is sufficient	✓			Low to moderate

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		land for any maintenance depots & parking areas, charging stations and bus stops in key areas for electric buses project. Hence discussions with CDA should make up part of the initial market sounding exercise.				
2	Design and construction risk	Design, construction, or commissioning of the facility (or elements of those processes) be carried out in a way that results in adverse consequences on cost and/or service delivery		✓		Moderate
3	Variation Risk	Any aspects not envisioned in the initial technical design / commercial feasibility either during the transaction structuring phase by the Government, or during the initial bid by private party (based on preliminary design) may have adverse impact on the project costs. Depending on whether this variation is required by the Government or private party to achieve the desired outcomes as per the bidding documents, this risk may be allocated to either party			✓	Low
4	Time / cost over-runs	Any delays in CPs prior to financial close, or delays by the private party in procurement of e-buses may cause delays in project execution timeline and hence increase costs to the private party	✓			Low
5	Relocation of Utilities	This is the risk that during project construction, some utilities need to be relocated due to construction that would overtake the existing installed utilities. Any delays caused by Government counterparts for relocation of utilities tends to delay the project		✓		Low
6	Financing risk	Private finance may not be available and hence project will not prove financially robust or in worst case may not close. Furthermore, changes in financial parameters after project award may alter the bid price before financial close	✓			Moderate

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7	Interest rate risk	If the borrowing rate, whether it is KIBOR for local financing or LIBOR / some other rate in case of foreign financing changes, this directly impacts the level of returns for the concessionaire. Traditionally in BOT modalities, most or all this risk is borne by the private party. However, if the Project is structured on BLT, all of this risk is taken by the Government. If the BOT modality has some sort of interest linked Government subsidy paid to the concessionaire in case interest rates increase, then this risk may be shared between public and private sector			✓	Moderate to High
8	Promulgation of Implementation agency and associated regulations	Since the CMTA has not yet been formed and there is ambiguity with regards to timing of formation of the Authority, as well as promulgation of its laws and regulations	✓			High
9	Demand risk	Depending on the transaction structure, this risk can be parked either completely with the concessionaire with traditional BOT modalities, or completely with public sector in BLT modality. Similarly, in hybrid BOT modalities with Government support during operational period, this risk may be shared between both parties			✓	Moderate to High
10	Change in Law	In case there is a change in law which impacts returns for the concessionaire, traditionally concession agreements give leverage to the concessionaire and the Government bears this risk	✓			Moderate to High
11	Enforcement	Enforcement of bus fare / enhancement of fare or other revenue sources may not be acceptable to commuters. The private party may not be able to enforce bus charges on the public which may cause a detriment to their revenue collection and project returns. Hence it is important to conduct a bankable willingness to pay survey both	✓			Moderate to High

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		initially during transaction structuring, and also by the bidder during the tendering process				
12	Political	In case there is a major political event which impacts returns for the concessionaire, traditionally concession agreements give leverage to the concessionaire and the Government bears this risk.	✓			Moderate to High
13	Performance, Operating and Maintenance risk	Obligations as per concession agreement are not being met by the concessionaire such as standards of quality of the service. Hence it is important for the concessionaire and operator to have high level of credibility and good experience of conducting similar projects		✓		Low to Moderate
14	Force Majeure	Any natural disasters, fires, epidemics / pandemics that impact the project either during construction or operation stage. Since this risk is uncontrollable, it is usually shared between the public and private party. Adequate insurances must always be undertaken, and hence make part of the project bidding documents			✓	Low to Moderate
15	Protests by existing private vehicle owners	This has been a problem faced by prior Governments with previous public transportation initiatives undertaken, hence the Government shall have to provide adequate security to the private party especially in the initial years	✓			Moderate
16	High Charging Cost	This is difficult to mitigate, since the electric buses shall have larger battery sizes compared to smaller electric vehicles and hence will bear excess costs. However, the Pakistan Electric Vehicles Policy 2020-2025 offers various benefits to electric vehicles, including incentivized power tariffs on charging stations. These benefits should be accounted for in the detailed commercial feasibility study. ¹⁷		✓		High

¹⁷ <https://invest.gov.pk/sites/default/files/2020-07/EV%2023HCV%20130620%20PDF.pdf.pdf>

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17	Electricity Availability	<p>For effective implementation of the project, it will need to be ensured that charging stations always have electricity available to adequately supply the ebus with electricity as required for smooth operations of the project.</p> <p>The Government is best suited to undertake this risk, and this shall be a significant incentive for private party participation in this project. Hence discussions with IESCO should make up part of the initial market sounding exercise.</p>				Moderate
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7. Value for Money (VfM) analysis

7.1 Qualitative VfM analysis of PPP procurement

The value for money analysis in a PPP project is sub-divided into qualitative and quantitative VfM, which need to be seen in conjunction with one another. To conduct an effective VfM analysis, the public sector must identify all or as many qualitative issues as possible that could impact the project. Key areas required to be assessed are as follows:

1. Project viability as PPP – examining how strategic and regulatory issues may affect private participation in project implementation, e.g., are there significant benefits to the Government for procuring E-buses in terms of lower taxes or duties as compared with the private sector.
2. How PPP will bring efficiency/innovation, accountability of service or infrastructure provision, operational flexibility, measurable and definable outputs. For this Project, it is expected that involvement of private sector will provide easier access to financing especially in the case of a reputable concessionaire, provide best possible e-bus solutions that provide optimal quality at reasonable price and conduct operations in such a way to ensure a safe and reliable experience to commuters.
3. Desirability – analyzing the benefits and costs of developing the project as a PPP, considering incentives & risk transfer, and assuming a whole-of-life costing approach. Essentially, it will need to be determined whether undertaking this mass transit upgradation via e-buses does indeed provide benefits to commuters along with other incremental benefits such as reduction in pollution and carbon footprint.
4. Capacity - verification of the market interest and public-sector capacity in developing and managing the PPP project; an initial market sounding and associated results are provided in section 5 of this document, however this shall be supplemented by gauging interest of reputable potential private parties.

Certain qualitative factors could materially impact the overall VfM decision making process:

1. Cash flow analysis may indicate that the PPP option is more expensive, but this could be because the model is not able to account for better quality procurement and significant innovation regarding ebuses or battery technology used by the private sector, resulting in a superior solution offered to public procurement.
2. The PPP proposal is sufficiently unique and may be beyond the capacity of the public partner due to specific factors not realized earlier.
3. If the project is not a stable enough endeavor, the PPP option may not be preferable as PPP contracts lack flexibility and may result in multiple renegotiations that may drive up costs, hence it is imperative that such routes are chosen which have a high expected footfall, and the existing solution for commuters is inadequate.

7.2 Quantitative VfM analysis of PPP procurement

For the most useful quantitative VfM analysis, it is best to wait for a high-quality commercial feasibility study and financial model. This will result in the highest quality VfM analysis. The purpose of conducting a quantitative assessment is to calculate the difference of undertaking this Project through traditional procurement or through PPP and see which procurement method provides the least cost to the Government. This considers the complete life-cycle cost of the Project, not only including any initial up-front costs, but also costs that the Government is expected to bear throughout the Project life cycle. The difference between these two methods will estimate which option provides the most cost-effective solution to the Government.

7.3 Fiscal Affordability

Fiscal affordability is the assessment of the affordability of the project from the government's perspective based on the extent and nature of fiscal support and its quantification. This includes a thorough Fiscal Commitments & Contingent Liabilities (FCCL) analysis, which can only be effectively undertaken after development of a quality commercial feasibility study and associated financial model.

Based on the analysis to be undertaken in detailed feasibilities as defined in section 4, the Government and its advisors should try to ensure an optimal transaction structure which assesses all options to minimize government support. These may include changing the concession period, project scope optimization, accounting for additional sources of revenue, adjustments in bus fare etc. Additionally, it will need to incorporate some key findings from the market sounding, which has partially been undertaken and highlighted in section 5.2 of this document.

Since there have been no PPP transactions undertaken in Pakistan for e-buses or indeed any sort of bus network, regional expertise must be sought. Regardless, there is sufficient traction in the transport sector in Pakistan from PPP perspective, and the existing body of knowledge can provide a reasonable benchmark for future analysis.

When assessing the actual quantitative elements of Government support, key factors for consideration include:

1. The actual annual payment amount forecasted must fall within the budget, and ideally the budget should be a function of the forecasted Government support. This amount could be minimum revenue guarantee arrangements, availability payments or subsidies during construction / operation.
2. In case of a termination event or triggering of a guarantee arrangement, the expected payout should fall within the assumed range for Government budgetary limits. Both direct and contingent liabilities must be well within these limits and acceptable to the Government during the structuring phase.
3. The Government and its advisors must plan ahead to ensure minimal fiscal risks emerge from the Project by ensuring a clear mitigation strategy. These risks are detailed further in section 6.2 of this document.

8 Way forward

8.1 Potential for MDI/Bi-Lateral support

Given the positive expected implications of this Project on the environment, especially related to the reduction in greenhouse gases, an e-buses project such as this could generate support from MDIs and bilateral. Since the Project will be in the capital Islamabad, it will also have significant visibility across the region and hence MDIs/bi-laterals may be even more willing to extend support.

The Nature of MDI/bi-lateral support would depend on the selected business model and financial structure, including following options:

- Direct lending to sovereign / sub-sovereign entity for financing of e-buses or associated infrastructure. This implies that non-PPP models could also be explored in this type of financing structure.
- Blended financing options, e.g., long-term low interest rate loans by MDIs, in conjunction with traditional financing channels to reduce overall impact of interest payments of the Project.
- Using guarantees as credit enhancement for sovereign / non-sovereign entity to access green financing (bonds).
- Using loans or guarantees for credit enhancement in case of private sector participation – payment security mechanism, partial credit guarantee, etc.

8.2 Conclusion and next steps

It is recommended that a detailed feasibility study be carried out to effectively implement the project on a PPP basis. Some of the key issues that need to be reviewed in this regard will include:

1. Review of the legislative and regulatory framework (including CMTA Ordinance)
2. Stakeholder consultative sessions
3. Finalization of TORs for Transaction Advisors
4. Appointment of Transaction Advisors
5. Initial due diligence (including demand studies and willingness to pay) and options analysis including review of the proposed routes
6. Undertaking an Environmental and Social Impact Assessment
7. Revalidate existing 'Implementation Strategy' by Gaheez consultants conducted in 2016 or conduct new technical and commercial studies as required
8. Development of business model and transaction structure
9. Implementation of approved transaction on PPP mode

Annex-I

Reference Outline Terms of Reference of Transaction Advisor

The Transaction Advisor's work is proposed to be conducted in three phases;

- Initial Due Diligence & Options Analysis
- Transaction Preparation
- Transaction Implementation

✦ Initial Due Diligence & Options Analysis

The Transaction Advisor will conduct initial due diligence of the situation and analyze the options available and recommend best option/solution. The Terms of Reference in the first phase would include review of existing studies, carrying out confirmatory studies if required. Due Diligence of the Overall Transport Situation in Islamabad/Rawalpindi, Origin / Destination Studies, Travel Pattern Studies, Market Analysis / Ridership Studies / Development Potential, Capabilities & Willingness to pay studies, Review of all relevant laws and suggestions/recommendation in this regard

✦ Transaction Preparation

In the second stage, the Transaction Advisor will develop and recommend the most optimal transaction structure for the project. The terms of reference in the second stage would include Environment, Social & Economic Review, Assessment of Investor Interest, Risk Allocation Government vs. Private, Financial Modeling and Transaction Structure Report.

✦ Transaction Implementation

In the third stage, the Transaction Advisor will assist in finalizing and implementing all Transaction structuring and legal/contractual issues which have been decided upon during the previous phase. In addition, the advisor will assist the implementing agency in marketing the transaction, pre-qualifying investors, due-diligence by the bidders, preparing and finalizing the contractual documentations, preparing financial model, implementing the bidding process, and assisting with the closing of the Transactions.

✦ Outline Terms of Reference of Sub-Contractors of Transaction Advisor

The Transaction Advisor will have sub-contractors to perform specialized functions. The advisor will have the following sub-contractors.

- Legal Consultants
- Technical Consultants
- Social / Environmental Consultants

✦ Legal Consultants

The Legal Consultants would work under the coordination and supervision of the transaction advisor. The Terms of Reference of the Legal Consultants would include Reviewing laws and regulations and identifying any impediments/constraints, providing input for the Information Memorandum, Pre-qualification criteria for bidders, preparing bidding & contractual documents, assisting in pre-qualification of bidders and assisting in transaction closure.

✦ Technical Consultants

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The Technical Consultants would work under the coordination and supervision of the transaction advisor. The Terms of Reference of the technical consultants would include the following:

- Conducting Initial Due Diligence of the Overall Transport Situation in Islamabad/Rawalpindi, Origin / Destination Studies, Travel Pattern Studies, Market Analysis / Ridership Studies / Development Potential, Capabilities & Willingness to pay studies, Alignment Studies, right of way study

Assisting in drafting Information Memorandum, Pre-Qualification criteria; Request for Proposals ("RFP") and Project Documents.

Assisting in conducting due-diligence process, assessment of bid evaluation, negotiation and revision of Project Documents.

Social / Environmental Consultants

Assisting in drafting the social and environmental aspects of the bidding documents, assisting in responding to social and environmental issues and queries raised by prequalified bidders during the process, and in modifying those aspects in the final bidding documents.

- Identification of key technical/commercial issues, developing technical specifications (design, construction schedule, performance standards etc.), Assessing Economic impact including saving through improved health, reduced congestions, property gains, energy saving etc.
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