GIZ - TRANSfer Project | Facilitating the development of ambitious transport mitigation actions

Evaluation Scheme for *Jeepney Modernisation* Demonstration Corridor – Philippines

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

On behalf of:

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

of the Federal Republic of Germany

Deutsche Gesellschaft
für Internationale
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Background Information on the TRANSfer Project

The TRANSfer project is run by GIZ and funded by the International Climate Initiative of the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). Its objective is to support developing countries to develop and implement ambitious climate actions in the transport. The project follows a multi-level approach:

- At country level, TRANSfer supports selected partner countries in developing ambitious climate actions in the transport sector. The mitigations actions supported by the project cover a broad variety of approaches in the partner countries Indonesia, Philippines, Peru and Thailand.
- At international level and closely linked to the UNFCCC process, the project helps accelerate the learning process around climate-friendly transport with a comprehensive set of measures (events, trainings, facilitation of expert groups, documents with guidance and lessons learned such as the transport NAMA handbook and a database, which is an interactive wiki-based portal that provides access to transport NAMAs).

Activities at country and international level are closely linked and designed in a mutually beneficial way. While specific country experience is brought to the international stage (bottom-up) to facilitate appropriate consideration of transport sector specifics in the climate change regime, recent developments in the climate change discussions are fed into the work in the partner countries (top-down).

For more information see: http://www.transferproject.org

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1 INTRODUCTION

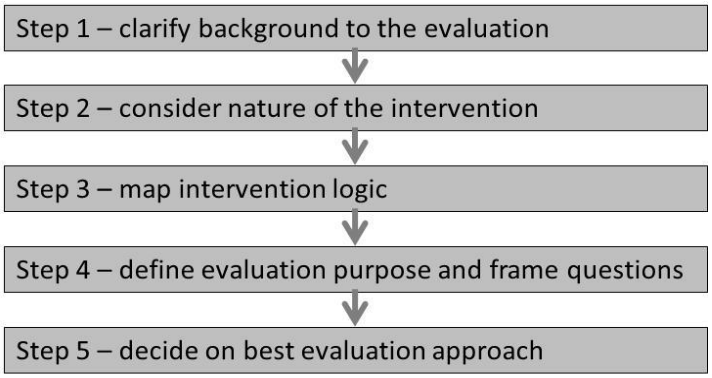
As an important early step in the delivery of the planned Jeepney Sector Modernisation Programme, the Department of Transport (DOTr) proposed to showcase the new form of operation and new jeepney vehicle technologies on a pilot jeepney route. This Jeepney Demonstration Corridor will allow the demonstration of the concept to the public and also to the transport sector.

This note considers the defining of an appropriate framework within which to monitor and evaluate the performance of the demonstration corridor. The evaluation is intended to provide the evidence base upon which to provide policy makers and transport sector stakeholders with a robust set out outcomes of the project and clear evidence on the impact of the pilot scheme.

2 EVALUATION APPROACH

> *"Evaluation can offer robust quantitative and qualitative data on the outcomes and impacts of a policy, programme, package or scheme: providing evidence not only for what changes it produced but also why and how these changes came about. Sound evidence has, in turn, a crucial role to play to improve the evidence base for future policy making"*

Defining an appropriate evaluation approach is prerequisite to the development of the monitoring framework. Drawing on Internationally recognised guidance on evaluating the impact of transport Projects (as published by the UK's department of Transport), we can identify the following steps to determining the best evaluation approach.



Below we consider each of these steps in turn, relating these to the objectives of the Pilot Jeepney Corridor and the wider context of the Public Utility Vehicle Modernisation Program

2.1 Background to the evaluation

In order to effectively evaluate the outcomes of the Jeepney Demonstration Corridor, it is necessary to consider the wider context in which the interventions are being implemented and the underlying reasons for implementing the project.

The Department of Transportation is launching a sector reform program which has been titled the Public Utility Vehicle (PUV) Modernisation Program. The program features a range of areas of reform, within which the following components can be identified:

- **Regulatory reform** – changes to the franchising of public transport routes
- **Local public transport route planning** – devolving responsibility for local network planning to the Local Government Units (LGUs) who are best placed to identify local needs
- **Route Rationalisation** - determining the appropriate mode, capacity and level of service on each transport corridor
- **Industry Consolidation** – a move from the 'one franchise, one operator, one unit' model to consolidated operations delivered through co-operative, consortium of corporation operating models
- **Fleet modernisation** – replacement of ageing, unsafe and inefficient vehicles with new models complying with environmental, safety and user comfort standards
- **Financing of modernisation**– financing options to make fleet modernisation more accessible
- **Vehicle useful life program** - Policies and programs which ensure appropriate treatment of vehicles during useful life, including type approval of new vehicles, a motor vehicle inspection system and scrappage at end of vehicle life
- **Pilot Implementation** – piloting of new vehicles and new operating models, regulatory approach and form of operation to demonstrate concept and to allow evaluation
- **Stakeholder support mechanism** – training and social programs to equip stakeholders with skills and capacity to meet the needs of the future system
- **Communications** – Conveying of objectives, benefits and progress of program to stakeholders

It can be seen that whilst the Pilot program is a project in itself, it sits within a wider program, and its objectives and rational is interrelated to other strands within the PUV Modernisation Program. The evaluation approach must therefore take account of this wider context to ensure that the information collected, and the assessments undertaken are aligned with wider requirements of the Program.

2.2 Nature of the Intervention

To inform the requirements of the evaluation, there is a need for a clear understanding of the nature of the intervention (scheme) being proposed. The Pilot Implementation provides the opportunity for demonstration of the concepts of the PUV modernisation program. As such, whilst details of the pilot may evolve, the following characteristics of the pilot can be taken as given:

- **New vehicle technology** – the pilot will permit the trialling of the new vehicle types and technologies, allowing demonstration of real-world performance
- **New form of operation** – the demonstration corridor is anticipated to have differing franchise arrangements, and encourage the delivery of services under a consolidated form of operation
- **Service rationalisation** – the level of service offered on the corridor will be carefully matched to demand and service standard requirements
- **Stakeholder support** – partnership between the transport authorities and operators in the testing and operating of new vehicles and forms of operation can be expected, in order to identify challenges and overcome early obstacles
- **Communication** – the demonstration corridor offers the ability to sensitise the public to the potential benefits of modernisation, facilitating the collection of real world evidence on performance and seeking the views of stakeholders on the new concept

The evaluation framework should reflect these various elements of the pilot project. The framework must also take account of the overarching objectives of the project and the wider modernisation program, ensuring there are mechanisms to assess performance against the stated goals. These have been defined as follows: To deliver:

- Safe and comfortable transport
- Predictable travel time
- Disciplined and competent drivers
- Fair regulations

2.3 Mapping the intervention logic

The third stage of establishing the evaluation approach is about "clarifying the main components that are required to enable the intervention to deliver its intended impacts and to articulate how these are connected. The aim of this step is to help the reader build a map of the intervention logic to diagrammatically illustrate the relationship between the intervention and the intended impacts.

This section therefore brings together the points raised so far in order to map out the intervention logic which can then be used to define what should be evaluated and how it should be evaluated.

Table 2 1 illustrates the logical progression from the issues that have driven the need for the PUV Modernisation Program, its objectives, and the specific components which form part of the pilot implementation project. The following stages of the process use Table 2 1 as the basis for defining appropriate evaluation techniques, but also draw upon experience of evaluating the impact of transport schemes to ensure the impact of the demonstration corridors appropriately captured and quantified.

Table 2.1 – Public Utility Vehicle Modernisation Program : Context and Objectives

Contextual Issues behind PUV Modernisation Program	Objective	Intervention (Pilot Implementation Program)
Increasingly motorized population & slow travel speeds across Manila's highway network	Enhance attractiveness of public transport to limit growth in private vehicle use and build the foundations for future transport network sustainability	• Regulatory reform • Route rationalisation • Industry consolidation • Fleet modernisation • Stakeholder support/training • Communication
Public transport offering poor quality, uncomfortable and prolonged journeys	Offer safe, predictable and comfortable public transport journeys	• Regulatory reform • Route rationalisation • Industry consolidation • Fleet modernisation • Stakeholder support/training
Poor driving behaviour offering unsafe travel for passengers and impacting on traffic conditions for other road users	Ensure disciplined and competent public transport drivers	• Regulatory reform • Industry consolidation • Fleet modernisation • Stakeholder support
Highly fragmented transport sector making management of performance standards challenging	Put in place the foundations more effective regulation of the sector and more appropriate operating models	• Regulatory reform • Industry consolidation • Stakeholder support/training
Increasing levels of air pollution	Improve environmental credentials of the public transport fleet	• Route rationalisation • Fleet modernisation
Poor safety standards and high road casualty rates	Improve vehicle safety standards and driving behaviour	• Industry consolidation • Fleet modernisation • Stakeholder support/training
Fair regulation	Ensuring balance between needs of passengers and sustainability of the transport industry	• Regulatory reform • Financing PUV modernisation • Stakeholder support/training
Mistrust and resistance from transport sector to make necessary reforms	Work with the sector to deliver improved public transport in partnership	• Stakeholder support/training • Communication

2.4 Defining the purpose, questions and approach

Having defined the context, objectives and intervention approaches adopted to move towards the objectives, the evaluation requirements for the pilot implementation corridor become more straightforward to define. Below, we examine each objective and how we might best evaluate pilot scheme performance against the stated objective.

2.4.1 Enhanced attractiveness of Public Transport

Table 2.2 – Importance of Public Transport Journey Attributes

Contextual Issues in PUV Modernisation	Objective	Interventions
Increasingly motorized population & slow travel speeds across Manila's highway network	Enhance attractiveness of public transport to limit growth in private vehicle use and build the foundations for future transport network sustainability	• Regulatory reform • Route rationalisation • Industry consolidation • Fleet modernisation • Stakeholder support/training • Communication
Public transport offering poor quality, uncomfortable and prolonged journeys	Offer safe, predictable and comfortable public transport journeys	• Regulatory reform • Route rationalisation • Industry consolidation • Fleet modernisation • Stakeholder support/training

As a principal objective of PUV modernisation and pilot implementation, developing the appropriate means of evaluating the demonstration corridor performance in delivering a more attractive form of public transport is essential. We must therefore consider the aspects of a public transport journey which contribute most strongly to the attractiveness of the service. The table below reports on the relative importance of different journey elements, as defined by public transport users of different modes during previous survey work. Respondents were asked to rank journey attributes on a scale of 1 to 4, with 4 being the most important.

Table 2.2 – Importance of Public Transport Journey Attributes

	Jeepney	LRT/MRT	Aircon bus	NonAirC bus	FX Expss
Too few services	2.9	2.6	2.5	2.7	2.6
Takes too long	3.0	2.7	3.1	3.5	3.2
Uncomfortable	2.8	2.7	2.4	2.8	2.8
Too expensive	2.9	2.7	2.4	2.9	2.9
Wait a long time to board	3.2	2.9	2.8	3.2	2.7
Services do not go where I want	2.9	2.6	2.0	2.5	2.3
Have to use more than one vehicle	2.9	2.7	2.2	2.5	2.6
Cannot travel at time I want to	2.8	2.6	2.0	2.5	2.4
Travel is unsafe	2.8	2.6	2.2	2.7	2.5

Source: ITP surveys for Road Transit Rationalisation Study (RTRS)

Long waiting times and long journey times ranked highly as the most frustrating aspect of jeepney journeys. Therefore, appreciation of how the services offered on the pilot corridor impact on these prioritised aspects of journey time are important to the evaluation.

- Public transport vehicle frequency counts should be undertaken to capture supply capacity on the corridor at different times of day. These can be undertaken as part of a classified traffic count capturing all vehicles travelling along the corridor.
- Boarding time surveys should be undertaken to establish baseline conditions, and again once the pilot corridor is in operation. These should take place not only at the terminals of the route, but also at points along the route, to ensure that availability of service is not restricted to the point of departure of the service.
- Public transport journey time surveys should be undertaken to establish how travel times evolve following the introduction of the new form of operation.
- Journey time reliability, as a key policy objective, should not be overlooked. This can be incorporated into the journey time survey evaluation.
- Private vehicle journey time surveys should also be conducted to understand traffic conditions for general traffic along the corridor.

2.4.2 Effective regulation of the sector

Contextual Issues in PUV modernisation	Objective	Interventions
Poor driving behaviour offering unsafe travel for passengers and impacting on traffic conditions for other road users	Ensure disciplined and competent public transport drivers	• Regulatory reform • Industry consolidation • Fleet modernisation • Stakeholder support
Highly fragmented transport sector making management of performance standards challenging	Put in place the foundations more effective regulation of the sector and more appropriate operating models	• Regulatory reform • Industry consolidation • Stakeholder support/training

An important element of the PUV modernisation is ensuring that the transport authority has the tools to effectively carry out its duty to manage the transport network and to ensure quality public transport offers an alternative to private vehicle usage.

Defining performance measures to assess driving behaviour are more complex than assessing some of the more measurable aspects of travel like journey time or reliability. Equally, assessing the effectiveness of regulation is more abstract than straightforward journey metrics. We can differentiate between physical performance and user perception. As such, effectively capturing regulatory performance must focus on both aspects:

- Number of vehicle units and number of different operating entities delivering services on the corridor
- User perception of behaviour and safety on the corridor, captured through user surveys

2.4.3 Environmentally friendly travel

Contextual Issues in PUV modernisation	Objective	Interventions
Increasing levels of air pollution	Improve environmental credentials of the public transport fleet	• Route rationalisation • Fleet modernisation

There are two elements involved in assessing the environmental benefits of the demonstration corridor with regard to the environment. Firstly, to reduce greenhouse gas emissions and secondly to reduce vehicle emissions to improve air quality. CO_2 emissions from burning fuel represent a greenhouse gas (GHG) and is believed to lead to global warming. Local air pollutants that cause the greatest impact on human health that are emitted from road vehicles are nitrogen dioxide (NO_2) and particulate matter (PMx). These two elements can be monitored as follows:

- Before and after surveys of NO_2 and PM (2.5 and 10) at different points along the corridor.
- Model the impact on greenhouse gas emissions based on the number of vehicle kilometres travelled on corridor before and after intervention implementation. Fuel consumption figures will be taken from the operating performance surveys (see below)
- Establish mix of vehicle technologies in operation along corridor, with targets for proportion complying to EURO4 or above

2.4.4 Safe Travel

Contextual Issues in PUV modernisation	Objective	Interventions
Poor safety standards and high road casualty rates	Improve vehicle safety standards and driving behaviour	• Industry consolidation • Fleet modernisation • Stakeholder support/training

Establishing the impact of pilot operations on road safety can be inferred through the monitoring of accident rates.

Using CITOM accident data, police records and hospital records, an analysis of accidents should be undertaken along the pilot corridor before and after operations implementation. If feasible, the severity of accidents should be monitored and the vehicle types involved in accidents should also be evaluated to understand the impact of the scheme on road safety

2.4.5 Fair regulation and operational performance

Contextual Issues in PUV modernisation	Objective	Interventions
Fair regulation	Ensuring balance between needs of passengers and sustainability of the transport industry	• Regulatory reform • Financing PUV modernisation • Stakeholder support/training
Mistrust and resistance from transport sector to make necessary reforms	Work with the sector to deliver improved public transport in partnership	• Stakeholder support/training • Communication

Public transport operators are commercial entities with a strong interest in maintaining the returns generated from operating within the sector. The threat to livelihoods is one of the main concerns relating to the PUV modernisation program and it is critical that the opportunity of piloting new operations on demonstration corridor be used to collect evidence on operational performance for the industry to evaluate.

The concern of public transport operators regarding the ability to make the necessary investment and whether the operational characteristics of new vehicle technologies would underpin sustainable operations. The following operational performance indicators should be captured:

- Vehicle cost
- Fuel consumption
- Maintenance costs
- Daily operated kms
- Daily passengers carried (and hence average load factors)
- Daily revenue
- Operator perception collected by means of detailed operator survey relating to experience of new operating practices and the new vehicle technologies

Having identified the evaluation requirements for each area of interest, Table 2-3 can be further developed to illustrate the complete intervention logic with the proposed evaluation measures and potential performance indicators:

Table 2.3: PUV Modernisation Program – Indicators and Data Sources

Contextual Issues behind PUV modernisation Program	Objective	Potential Indicators	Data Sources
Increasingly motorized population & slow travel speeds across Manila's highway network	• Enhance attractiveness of public transport to limit growth in private vehicle use and build the foundations for future transport network sustainability	• PT Frequency • Average waiting time • PT journey time • Journey time reliability • User satisfaction • Highway journey times	• Classified traffic counts • Boarding time survey • PT journey time survey • User survey • 'Floating car' journey time surveys
Public transport offering poor quality, uncomfortable and prolonged journeys	• Offer safe, predictable and comfortable public transport journeys		
Poor driving behaviour offering unsafe travel for passengers and impacting on traffic conditions for other road users	• Ensure disciplined and competent public transport drivers	• Number of operating units • Number of operating entities • User perception of driver behaviour and safety	• LTFRB data • Vehicle survey • User survey
Highly fragmented transport sector making management of performance standards challenging	• Put in place the foundations more effective regulation of the sector and more appropriate operating models		
Increasing levels of air pollution	• Improve environmental credentials of the public transport fleet	• Local air quality (NO2, PM) • GHG emissions • Fleet emissions standards	• Local air quality survey • Fuel consumption survey • Emissions modelling • Vehicle survey
Poor safety standards and high road casualty rates	• Improve vehicle safety standards and driving behaviour	• Accident rate/1000 trips • Severity of accidents	• Accident statistics
Fair regulation	• Ensuring balance between needs of passengers and sustainability of the transport industry	• Vehicle cost • Fuel consumption • Maintenance cost • Daily kms operated • Passengers carried • Daily revenue • Operator perception	• Operating surveys • Operator perception survey • Boarding and alighting survey
Mistrust and resistance from transport sector to make necessary reforms	• Work with the sector to deliver improved public transport in partnership		

3 EVALUATION INDICATORS AND DATA COLLECTION PLAN

From the above discussion and analysis of the objectives of the project and potential indicators and data sources, a number of potential performance indicators have been proposed as appropriate for use in the evaluation of the performance of the project. These are listed below, accompanied by specific performance metrics upon which the performance measure can be based:

3.1 Performance Indicators

Table 3.1 – Perfomance Indicators

Thematic Area	Indicator	Metric
Public transport journey quality	• PT frequency • Average wait time • Journey time • Journey reliability • User satisfaction	• Buses per hour (BPH), by route X minutes typical wait in Peak/off-peak • Typical route journey time (end-to-end) Standard deviation of Journey time • User satisfaction – various, covering all aspects of journey experience
Corridor conditions	• Traffic volumes • Passenger flows • Highway journey conditions • Number of operating units • Number of operating entities	• PCU peak hour / all day (AADT) • Person flows peak hr / all day Average traffic speeds in peak hour • Number of units • Number of operators
Environmental	• Local air quality • GHG emissions • Fleet emissions standards	• NO_2 levels, NO_x levels • CO_2 emissions/yr
Safety	• Accident rate	• Accidents/1,000 trips
Operational parameters	• Vehicle cost • Fuel consumption • Maintenance costs • Daily kms operated • Passengers carried • Daily revenues • Operator perception	• Vehicle cost PHP • l/100km • Routine maintenance cost/mth, exceptional costs • Daily kms per vehicle • Daily passengers per vehicle • Daily revenue • Operator perception – various covering all aspects of operating experience

Below we consider the necessary data collection to populate the indicator and the baseline data collection requirements.

3.1.1 Public Transport Journey Quality

Improving public transport journey quality is a key objective of the pilot corridor, so focusing data collection resources in this area is of high importance. The following performance metrics are proposed:

- **Buses per hour (BPH)** – a measure of service frequency. If multiple routes are operating on the corridor then the service frequency should be captured for each route. This should also be captured for different times of day, with service frequencies expressed for peak period and off-peak period. Service frequency can be captured through PT frequency surveys undertaken at an appropriate point along the corridor to ensure the relevant routes are covered.
- **Average wait time** – anticipated wait times can be derived from service frequency (assuming average wait time is half the service headway) providing there is available capacity to board vehicles. However, in the case of overcrowding at peak times, wait time can exceed anticipated time due to lack of capacity to allow boarding of vehicles. Wait time surveys can be undertaken through observation of travellers and time spent for an individual to board a vehicle, or as part of on-vehicle surveys, with surveyors attempting to board vehicles at different times of day, and recording the time taken to board.
- **Public transport journey time** – is of high importance to travellers. Undertaking end-to-end journey time surveys using GPS allows journey times for different sections of the route to be measures and reported.
- **Journey reliability** – is a more abstract concept, with a range of possible metrics of measurement. Standard deviation of journey time is one of the more straightforward measures of reliability, allowing calculation of a range of derived indicators. Multiple journey time surveys within each time period are required to robustly estimate journey time reliability.
- **User satisfaction** – will cover a range of areas and can be captured quantitively by asking respondents to rate satisfaction levels across different aspects of the journey.

3.1.2 Corridor conditions

Capturing impact of change in operating patterns on other highway users also forms an important part of the narrative of scheme success.

- **Traffic volumes** – are important to interpreting any observed changes in corridor conditions. Classified traffic counts covering all vehicle types, across the day will provide the necessary information to establish peak and daily traffic volumes.
- **Passenger flows** – can be established by accompanying the classified counts with vehicle occupancy surveys. This permits reporting of the proportion of travellers carried by public transport by comparison with private modes, and whether the demonstration corridor has led to changes in total volume of travellers carried on the corridor.
- **Highway conditions** – are typically measured in terms of traffic speeds. Floating car surveys using GPS data capture can measure traffic speeds, and undertaking multiple corridor runs at different periods of the day will allow typical speeds to be established. Thought may need to be given to the need to survey a 'control' corridor as a means of isolating observed changes from background trends, although for the purpose of

demonstration corridor evaluation, our view is that the extra data collection required is probably not justifiable.

- **Number of operating units and entities** – understanding the number of PUV units operating on the corridor in the baseline situation, and how many different operators are active in supplying the corridor would be useful information if it is possible to collect. Vehicle surveys using number plate capture can determine broadly the number of operating units, whilst LTFRB records can provide insight into operator numbers.

3.1.3 Environmental Conditions

Air quality has become an increasingly important area of political interest in recent times, and Manila is experiencing harmful levels of local air pollution. A significant benefit of the introduction of new vehicle technology is the greatly reduced local air pollutants generated compared to the highly polluting existing vehicles. Being able to quantify and provide evidence for the impact of the pilot scheme on air quality along the corridor would be valuable. Whilst measurement of air quality is a highly technical area, we believe that commissioning of local air quality surveys would be merited.

Estimation of greenhouse gas emissions is more straightforward to quantify, due to the direct relationship with fuel consumed. Modelling of corridor emissions can easily be undertaken, supported by the corridor traffic counts and fuel consumption surveys.

- **NO2 and NOx levels** – can be captured through local air quality surveys undertaken at the roadside at appropriate points along the corridor
- **GHG emissions/yr** – can be calculated from other survey data and would allow quantification of carbon savings attributable to the scheme
- **Environmental composition of fleet** – can form the basis for reporting the proportion of public transport vehicles on the corridor meeting the new Euro4 standards (or higher)

3.1.4 Safety

Assessing the safety impacts of scheme covering a small area is challenging, and only as robust as the available datasets. However, reviewing historical accident data captured on the corridor and monitoring the incidents of accidents following scheme implementation provides a means of capturing safety impacts.

Accident rate per 1,000 journeys - relates accidents to the number of trips made on the corridor, thus providing an appropriate basis for comparison of before vs after implementation.

3.1.5 Operational Performance

As key stakeholders of the project, the operators will be keen to understand the scheme impact in terms of operational performance. Assessing how the new vehicle technologies perform in real world conditions, and whether new forms of operating model will permit sustainable and profitable operations are an essential element of the evaluation.

- **Vehicle cost** – will be an important aspect of decision making for the operator when looking to modernise the fleet
- **Fuel consumption** – as one of the largest cost components, will be of great interest. This is typically expressed in terms of litres of fuel consumed per 100kms. Past PUV market surveys may form the source of baseline data unless new baseline surveys can be undertaken.
- **Maintenance costs** – will also be of interest. The cost of regular routing maintenance can be expressed as a monthly cost, while exceptional costs for repairs should also be reported. Again, previous market studies have collected information on this element of operating costs for existing operators.
- **Operated kms per day –** is standard operating performance metric. Baseline operating intensity information will need to be collected via operator survey, cross-referenced against in-vehicle survey data to ensure validity. If existing operators are willing to engage in the data collection process, GPS trackers could be fitted to collect accurate baseline information.
- **Passengers carried per day –** is the key determinant of revenues generated and hence a vital performance statistic. A move towards timetabled operations has the potential to influence daily passengers carried, as does different vehicle capacity. Baseline passenger data will need to be estimated by pairing PT frequency data with average loadings recorded from on-board surveys and validated with reference to occupancy surveys. Upon pilot implementation, similar surveys should be undertaken, to cross reference against ticket sale data.
- **Daily revenues** – are driven by passengers but also reflective of average journey length. Baseline revenues will need to be established from operator interviews and validated against observed load factors and operated kms.
- **Operator perceptions** – are of equal importance to traveller perceptions, as without these stakeholders, there is no sustainable public transport network. Collecting operator perspective on all aspects of operations pre- and post implementation is of critical importance.

4 Baseline Data Collection Plan

To inform the development of a baseline data collection plan, the table below sets out the proposed scheme performance indicators and highlights the data collection required to populate the baseline.

Table 4.1 – Baseline Data Collection Indicators

Area	Indicator	Indicator Metric	Baseline Data Requirements
Public transport journey quality	• PT frequency • Average wait time • Journey time • Journey reliability • User satisfaction	• Buses per hour (BPH), by route • X minutes typical wait in Peak/off-peak • Typical route journey time (end-to-end) • Journey time required to be 95% certain of arriving 'on-time' • User satisfaction – covering all aspects of journey experience	• PT frequency count Waiting time surveys at various stop locations • In-vehicle journey time surveys • Baseline user satisfactory survey
Corridor conditions	• Traffic volumes • Passenger flows • Highway journey conditions • Number of operating units • Number of operating entities	• PCU peak hour / all day (AADT) • Person flows peak hr/day Average traffic speeds in peak hour • Number of units • Number of operators	• Classified traffic count at various points on corridor • Vehicle occupancy survey (alongside classified count) • Floating car speed surveys • PT vehicle number plate survey LTFRB database
Environmental	• Local air quality • GHG emissions • Fleet emissions standards	• NO_2 levels, NO_x levels • CO_2 emissions/yr	• Local air quality survey Emissions modelling
Safety	• Accident rate	• Accidents/1,000 trips	• Accident data
Operational parameters	• Vehicle cost • Fuel consumption • Maintenance costs • Daily kms operated • Passengers carried • Daily revenues • Operator perception	• Vehicle cost PHP • l/100 km • Routine maintenance cost/mth • exceptional costs • Daily kms per vehicle • Daily passengers/unit • Daily revenue • Operator perception – various covering all aspects of operating experience	• Fuel consumption survey – existing vehicles • Operator survey • Operator survey – GPS if feasible • On board Boarding and Alighting Survey • Operator survey

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Eschborn, 17.11.2017