



**United Nations Environment Program**

**Terminal Evaluation of the UNEP/ GEF Project “Bus Rapid  
Transit and Pedestrian Improvements Project in Jakarta”**

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## Acronyms and Abbreviations

µg	microgram
ADB	Asian Development Bank
BLU	Badan Pelayanan Umum, public service entity
BRT	Bus Rapid Transit
<i>BUMD</i>	<i>Badan Usaha Milik Daerah</i> , regional government company
CEO	Chief Executive Officer
CNG	Compressed Natural Gas
DGEF	Division of GEF Coordination (in UNEP)
<i>DisHub</i>	<i>Dinas Perhubungan</i> , DKI transportation agency
<i>DisPU</i>	<i>Dinas Pekerjaan Umum</i> , DKI public works agency
<i>DKI</i>	<i>Daerah Khusus Ibukota</i> , special capital region, referring either to Jakarta or to its provincial government
<i>DPRD</i>	<i>Dewan Perwakilan Rakyat Daerah</i> , regional parliament, referring to the DKI parliament
FY	Financial Year
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (German international cooperation)
Gol	Government of Indonesia
IndII	Indonesia Infrastructure Initiative
ITDP	Institute for Transportation and Development Policy
<i>Kemenhub</i>	<i>Kementrian Perhubungan</i> , Ministry of Transportation
KPI	Key Performance Indicator
MRT	Mass Rapid Transit (rail)
M&E	Monitoring and Evaluation
MoF	Ministry of Finance MoHA Ministry of Home Affairs
MSS	Minimum Service Standard
MTE	Mid-term evaluation
NGO	Non-government organisation
NMT	Non-motorised transport
<i>Pergub 123</i>	<i>Peraturan Gubernur nomor 123 tahun 2006</i> , gubernatorial regulation on appointment of busway bus operators in DKI
PIR	Project Implementation Review
ProDoc	Project Document
<i>PT</i>	<i>Perusahaan Terbatas</i> , limited company
RPJMN	<i>Rencana Pembangunan Jangka Menengah Nasional</i> , national medium term development plan
RToC	Reconstructed Theory of Change
<i>Satpol PP</i>	<i>Satuan Polisi Pamong Praja</i> , regional Law enforcement agency
<i>Sekda</i>	<i>Sekretaris Daerah</i> , regional secretary
SOP	Standard Operating Procedure
SMART	Specific, Measurable, Achievable, Relevant and Time bound
TE	Terminal Evaluation
TDM	Transport Demand Management
TOD	Transport Oriented Development
TOR	Terms of Reference
UNEP	United Nations Environment Programme

## Project General Information

Table 1. Project summary

<b>GEF project ID:</b>	2954	<b>IMIS number:</b>	GFL-2328-2720-4960
<b>Focal Area(s):</b>	Climate Change	<b>GEF OP #:</b>	11
<b>GEF Strategic Priority/Objective:</b>	SO-6	<b>GEF approval date:</b>	28 November 2006
<b>UNEP approval date:</b>	21 November 2006	<b>First Disbursement:</b>	22 January 2007
<b>Actual start date:</b>	December 2006	<b>Planned duration:</b>	60 months
<b>Intended completion date:</b>	December 2011	<b>Actual or Expected completion date:</b>	31 December 2012
<b>Project Type:</b>	FSP	<b>GEF Allocation:</b>	\$ 5,812,000
<b>PDF GEF cost:</b>	\$ 348,300	<b>PDF co-financing*:</b>	\$
<b>Expected MSP/FSP Co-financing:</b>	\$ 187,975,000	<b>Total Cost:</b>	\$ 194,135,300
<b>Mid-term review/eval. (planned date):</b>	August 2009	<b>Terminal Evaluation (actual date):</b>	July 2013
<b>Mid-term review/eval. (actual date):</b>	April – June 2010	<b>No. of revisions:</b>	2
<b>Date of last Steering Committee meeting:</b>	17 December 2012	<b>Date of last Revision:</b>	17 October 2011
<b>Disbursement as of 31 December:</b>	EA- 5,721,539.00 MTE- 50,460.73	<b>Date of financial closure:</b>	Not financially closed
<b>Date of Completion:</b>	December 2012	<b>Actual expenditures reported as of 31 December 2012:</b>	\$5,524,884.64
<b>Total co-financing realized as of 31 December 2012:</b>	Total: \$117,888,282.11	<b>Actual expenditures entered in IMIS as of 31 December 2012:</b>	\$4,904,931.27
<b>Leveraged financing:</b>	Total: \$802,800.00		

## Executive Summary

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S1. The United Nations Environment Programme (UNEP), with funding provided by the Global Environment Facility (GEF), implemented the “Bus Rapid Transit and Pedestrian Improvements in Jakarta” project from December 2006 to December 2012. The global environmental objective<sup>1</sup> of the project was to reduce greenhouse gas (GHG) emissions from urban transportation. It aimed to do this by improving the Jakarta Bus Rapid Transit (BRT) system, known as Transjakarta, and support its system manager a unit with the same name, that was part of the City Government known as DKI Jakarta.

S2. The project commenced implementation three years after Transjakarta was first launched as an initiative of the then Governor of DKI Jakarta during which time four BRT corridors of generally poor quality were implemented. With the aid of associated Grant PDF-B, the project was designed in 2006 by the Executing Agency, the Institute for Transportation and Development Policy (ITDP), in collaboration with UNEP/ GEF.

S3. The project design was strategically-relevant and technically comprehensive but overestimated the status and capacity of Transjakarta and therefore underestimated the risks to project implementation (refer paragraphs 32-34). Further, the project design necessarily provided the ITDP with a supporting advisory role to the DKI Jakarta’s transportation agency, DisHub, Transjakarta and other agencies. That is, ITDP did not control any aspect of implementation since this task was in the hands of the existing agencies of DKI Jakarta.

S4. Although the project team quickly identified the problems related to an inadequate legal basis for, and dearth of technical capacity in, Transjakarta, the achievement of the project’s ambitious targets were significantly hindered from the outset. The project’s targets for corridor expansion were largely achieved through an investment of \$419 million although not to an adequate quality as shown by ITDP’s ratings. But poor attention by implementation agencies to improving the quality of bus services, reducing operational delays, improving ticketing and fares, and optimising bus feeders reduced the ease of using the BRT system (refer paragraph 77).

S5. CNG supply constraints unforeseen during project design were a fundamental problem for BRT operations and still impact on its efficiency today (refer Annex 6) It appears that despite annual perception surveys of BRT users and non-users by Transjakarta improving the quality of bus services delivered to bus passengers had a lower priority than building BRT infrastructure.

S6. The project’s achieved patronage increase from 2006 to 2012 was less than half of the planned increase of 600,000 pax/day<sup>2</sup> (compared to the actual 105,000 pax/day at end 2006). By the end of the project, BRT patronage was declining despite and expansion of the BRT system (refer Annex 1). Public attitudes to BRT were poor at the end of the project as shown (refer paragraph 57).

S7. A greater focus on meeting travel needs of existing and potential bus users would have likely resulted in increased estimates of GHG reduction but more importantly resulted in improved welfare outcomes for Jakarta’s travellers through reduced travel times and improved trip time reliability (refer paragraph 52). Such improvements in travel time and quality are more likely to lead to beneficial and complementary land use initiatives such as Transit Oriented Development.

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<sup>1</sup> Possibly better described as a ‘goal’ or ‘impact’.

<sup>2</sup> In fact, targeted for the original project close of end 2011.

S8. The project team's early focus during implementation supported the strengthening of the legal basis for Transjakarta. This resulted in fairly rapid implementation of the full BLU, a business unit of DKI Jakarta, by 2010. Given enabling national regulations were only developed in 2007 ITDP's support was arguably a success. However, the full potential of the BLU structure for Transjakarta was not exploited with outside management expertise shunned and little effort by DisHub and its political masters to require Transjakarta to improve bus operations. The failure to realise the potential of the BLU structure is a reason to be cautious in expecting a rapid turnaround in BRT performance through the conversion of Transjakarta to a BUMD as approved by DKI Jakarta's parliament on 30 December 2013.

S9. New challenges remain to be faced by Transjakarta with the expected disruption to Corridor 1, the main corridor of the BRT system and representing some 25% of its patronage, during Stage 1 of MRT construction. Further, there remains the possibility that when MRT Stage 1 is completed around 2018, that corridor 1 may be partially or fully closed. Nevertheless, the creation of the BUMD if properly structured and resourced offers great potential going forward.

S10. The achievement of the direct outcomes of the project was rated as 'Moderately Satisfactory' (refer para. 51). The assessment of likelihood of impact using a Review of Outcomes towards Impact (ROTI) approach based on the reconstructed TOC is 'Moderately Unlikely' as is the assessment of achievement of planned project goal and objectives. This assessment is largely based on the prevailing constraints that affect performance of the bus services provided by Transjakarta even when converted to a BUMD. Further, an effective BUMD would likely take several years to begin to operate effectively making it challenging to turn around the current declining patronage trend as it attempts to improve cost recovery. There is also the considerable challenge of effective integration with MRT in a larger multi-modal rapid transit system. Taking into account all factors, including the project's achievements, the challenging environment and the likelihood that further progress on some direct outcomes will be made in the near future, the TE's overall rating of project performance and potential was 'Moderately Satisfactory' (refer paras. 58-59). A summary of individual ratings for each evaluation criterion are set out in Table Si.

**Table Si: Overview of Evaluation Ratings<sup>3</sup>**

Criterion	Rating
<b>A. Strategic relevance</b>	Satisfactory
<b>B. Achievement of outputs</b>	Satisfactory
<b>C. Effectiveness: Attainment of project objectives and results</b>	Moderately Satisfactory
1. Achievement of direct outcomes	Moderately Satisfactory
2. Likelihood of impact	Moderately Unlikely
3. Achievement of project goal and planned objectives	Moderately Satisfactory
<b>D. Sustainability and replication</b>	Moderately Likely

<sup>3</sup> For details refer Table 6 page 37.

<b>Criterion</b>	<b>Rating</b>
1. Socio-political	Likely
2. Financial	Likely
3. Institutional framework	Moderately Likely
4. Environmental	Moderately Likely
5. Catalytic role and replication	Moderately Likely
<b>E. Efficiency</b>	Satisfactory
<b>F. Factors affecting project performance</b>	Satisfactory
1. Preparation and readiness	Moderately Unsatisfactory
2. Project implementation and management	Satisfactory
3. Stakeholders participation and public awareness	Satisfactory
4. Country ownership and driven-ness	Moderately Satisfactory
5. Financial planning and management	Satisfactory
6. UNEP supervision and backstopping	Satisfactory
7. Monitoring and evaluation	Satisfactory
a. M& Design	Moderately Unsatisfactory
b. Budgeting and funding for M&E activities	Satisfactory
c. M&E Plan Implementation	Satisfactory
8. Complementarity with UNEP strategies and programs	Not rated
<b>Overall project rating</b>	Moderately Satisfactory

S11. Based on the analysis and conclusions of the TE, the key lessons are set out below:

- An important and overarching lesson is that project design must be realistic and appropriate for the institutional environment and the technical capacity of prevailing agencies.
- Creation of appropriate institutions is no guarantee that they will automatically perform as anticipated without strong political direction, provision of adequate resources, appropriate incentive mechanisms for executives and staff, enhanced technical capacity and agreements with other agencies from whom other services and inputs are required.
- Improved project performance would likely result from a great focus on current and potential BRT passengers (or customers).

S12. Three recommendations were identified to assist UNEP/GEF with similar projects, and also Transjakarta, in future:

- Project design should include a thorough diagnosis of institutional and capacity constraints as well as prepare technical aspects. UNEP Quality Assurance Section should verify that future project designs include an institutional analysis with an appropriate level of depth.
- UNEP should consider using economic evaluation as used by International Financial Institutions such as the World Bank and Asian Development Bank for measuring the investment 'efficiency' of the transport projects and arguably all climate change mitigation projects, it supports. The UNEP Quality Assurance Section should actively promote the use of economic evaluation in future project design.
- UNEP should encourage other development partners to provide further support to the new Transjakarta BUMD to assume a more effective role in future.

## I. Introduction

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1. The United Nations Environment Programme (UNEP), with funding provided by the Global Environment Facility (GEF), implemented the “Bus Rapid Transit and Pedestrian Improvements in Jakarta” project from December 2006 to December 2012. GEF funding was made under ‘Strategic Priority 6: Modal Shifts in Urban Transport and Clean Vehicle / Fuel Technologies’, within its Operational Programme 11. Accordingly, the global environmental objective <sup>4</sup>of the project was to reduce greenhouse gas (GHG) emissions from urban transportation. It aimed to do this by improving the Jakarta Bus Rapid Transit (BRT) system, a unit of the Special Capital City<sup>5</sup> District of Jakarta (abbreviated as DKI Jakarta) and its related facilities.
2. The (lower level) objective of the project was “...to maximise the effectiveness of Jakarta’s BRT system and use it as a catalyst for urban transport reform in Jakarta and other key Indonesian cities.” This was to be accomplished through two project goals<sup>6</sup>: (a) improve performance of the Jakarta BRT and maximise ridership; and (b) utilise BRT to build the image of public transport and improve pedestrian facilities, transport demand management, non-motorised transport, and land use options in Jakarta and other Indonesian cities.
3. Due to the need to increase the duration of project-provided support the Institute for Transportation and Development Policy (ITDP), with approval of UNEP, extended their support (for the same overall project cost) from five to six years to provide further institutional, technical and financial advice needed by Transjakarta and the various relevant departments of the City itself.
4. The project supported DKI Jakarta to plan, design and implement BRT corridors and associated bus operations with a UNEP-GEF grant of \$5.8 million. The BRT initiative preceded the project by almost three years. Under the leadership of the then Governor of Jakarta, the first corridor of 13.6 km of the BRT, the first in Indonesia and in South East Asia, was implemented from commercial hub, Blok M in the south of the central city to Kota, the old city, in the north in January, 2004. Corridors 2 (13.3 km) and 3 (15.4 km) were opened in January 2006. Although the project design was intended to support implementation of corridors 4-14 during the project, in fact corridors 4-7 totalling 51.2 km opened in January 2007 just as the project commenced. By the close of the project, 11 BRT corridors with a total length of 180 km had been implemented. The 12<sup>th</sup> corridor of 24 km opened in January 2013 one month after operational completion of the project<sup>7</sup>.
5. Support to DKI Jakarta was provided in advance of the main project, the subject of this Terminal Evaluation (TE), by the UNEP-GEF PDF-B grant of \$363,000 that provided support over six months from March 2006<sup>8</sup> for implementation of corridors 2 and 3, outreach to Yogyakarta<sup>9</sup>, and for

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<sup>4</sup> Possibly better described as a ‘goal’ or ‘impact’.

<sup>5</sup> Jakarta has the same status as a Province.

<sup>6</sup> Referred to as goals in paragraph 85 of the Project Document.

<sup>7</sup> Refer Annex 1 that sets out a chronology of BRT corridor development and patronage.

<sup>8</sup> The executing agency of the larger project, the Institute of Transportation Development Policy, New York, USA had provided earlier assistance to DKI Jakarta via a \$1 million grant provided by USAID. ITDP was founded in 1985 and is an umbrella organisation for several worldwide peace and development initiatives and advocacy efforts, to promote environmentally sustainable and socially equitable transportation worldwide. See: [<http://www.itdp.org>].

preparation of the larger project.

## II. The Evaluation

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6. A TE is undertaken by UNEP after completion of a project to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. This TE was initiated by UNEP in line with the UNEP Evaluation Policy, Evaluation Manual (2008) and the Guidelines for GEF Agencies in Conducting Terminal Evaluations. The annexes to the Terms of Reference contained in Annex 13 provided guidance on evaluation procedures.

7. Undertaken from November 1, 2013 to 30 March 2014, the evaluation had two primary purposes<sup>10</sup>: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP, the GEF and their executing partners – ITDP and the relevant agencies of DKI Jakarta in particular. UNEP engaged two consultants to undertake the evaluation: (i) Philip Sayeg, Transport Specialist/ Team Leader from Australia who had past extensive experience in Indonesia; and (ii) Dr. Harun Lubis, Transport Specialist/ Professor at Institute of Transport Studies, Bandung, Indonesia. Neither consultant had any past involvement with the UNEP project and were therefore independent and impartial. Refer Annex 13 for brief Curricula Vitae of the consultants.

8. The evaluation relied on information contained in project documents, supporting technical reports, and information obtained by interview during the main field mission (December 1 to December 11, 2013) and subsequent follow up Dr. Harun Lubis, supplemented by other communication during the evaluation. Every effort was made to verify important information and conclusions from multiple sources and referral back to source documents. The evaluation team interviewed key stakeholders, reviewed technical documents and undertook analytical work to complete the evaluation according to the ToR. A survey of BRT 3,600 users was undertaken by the TE team from February 3-10, 2014 to inform the TE's analysis. Despite the comprehensive attempt to undertake the evaluation there are necessarily limitations. Use in some cases of interviews after the fact also may not always fully provide a good understanding of the actual circumstances surrounding events.

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<sup>9</sup> The capital of Yogyakarta Special Region in Java, Indonesia. Due to political issues in Yogyakarta, support was directed to Surabaya. Refer GEF (2007).

<sup>10</sup> Refer UNEP Evaluation's Office Terms of Reference (TOR) contained in Annex 10.

### III. The Project

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#### A. Context

9. At project formulation in 2004, DKI Jakarta, the capital of Indonesia, had a population over 8.3 million representing about a half of the population of the greater Jakarta region. The city covered an area of 650 square kilometres with an average population density of 13,000 inhabitants per square kilometre. Household income for the Jakarta metropolitan area averaged US\$150/month. Currently, the Jakarta metropolitan area (JABODETABEK –Jakarta, Bogor, Depok, Tangerang, Bekasi) is one of the world's largest mega-cities with an estimated 28 million inhabitants. At the time, Jakarta's 34 million daily motorised person-trips<sup>11</sup> generated significant air pollution with nitrogen oxides, total suspended particulate matters and carbon monoxide emissions regularly exceeded World Health Organisation Guidelines. Annual average ambient concentrations of fine particulate matter<sup>12</sup> was measured as 43 ug/m<sup>3</sup> in 2008<sup>13</sup> or more than twice World Health Organisation's guideline limit of 20 ug/m<sup>3</sup><sup>14</sup>. Emission inventory estimates indicate that vehicle emissions account for about half of airborne particulates<sup>15</sup> with roadside concentrations in close proximity to pedestrians, vendors, policemen and travellers much higher than indicated by ambient values.

10. With motorisation rapidly increasing<sup>16</sup> and very severe and extensive traffic congestion over much of the day, the speed of buses, the main mode of urban public transport, was declining<sup>17</sup>. The journey times of bus travellers, who are often the poorer groups in society, were thereby increasing. Bus productivity and bus profitability were declining contributing to a downward decline in demand, performance and new investment. Consequently, the share of daily trips carried by public transport in 2002 was estimated to be about 60% of daily person trips and was declining.

11. The land transport sector has consistently been one of the fastest growing emitters of GHGs and perhaps the most challenging sector in terms of reducing emissions. DKI Jakarta made some

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<sup>11</sup> JICA (2002), "Study on Integrated Transport Master Plan" (SITRAMP) estimated that daily person trips by public transport in 2002 represented 60% of total daily motorised travel of 34 million trips per day made up of 58% by bus and 2% by train respectively. By 2010, the share of trips by public transport was expected to decline to a total of 55% with bus representing 52% and train 3% respectively.

<sup>12</sup> Particulate matter of less than 10 microns in diameter (PM<sub>10</sub>) is a critical pollutant for human health as it can penetrate deep into human lungs.

<sup>13</sup> Reliable air quality data for 2004 at the outset of Transjakarta's development was not available to the TE team.

<sup>14</sup> WHO (2011), "Outdoor Air Pollution Data Base".

<sup>15</sup> World Bank (1998), "Urban Air Quality Management Strategy in Asia: Jakarta Report", Technical Paper 379.

<sup>16</sup> Private car and motorcycle ownership grew by an annual compound growth rate of 19.6% per annum and 8.6% per annum from 2000 to 2008 respectively (SDG 2011, Table 4.1) in JABODETABEK while population grew at a rate of 2.9% per annum to 26.3 million in 2008.

<sup>17</sup> Steer Davies and Gleave (2011), "Jakarta Feeder Bus Study: Base Year Transport Model Report." February, Table 5.3, shows that regular bus speeds on surface roads averaged an operational speed of just over 16kph in 2010.

important attempts to address these problems with BRT, limited traffic demand management, and non-motorised transport improvements (NMT)<sup>18</sup>.

12. To attempt to address these critical problems, the Jakarta BRT system was initiated by the then Governor of Jakarta in 2003 with a first corridor opening within six months of inception in January 2004. Rapid implementation of corridor 1, and the subsequent corridors 2 and 3 that were implemented by early 2006 (refer Annex 1), meant that significant institutional, physical and operational matters had not been properly resolved. These substantial residual problems hindered the development of an optimal BRT system. With four additional corridors opening at the outset of the UNEP project the obstacles to effective and efficient operations were significant. By October 2007, the newly elected Governor, resolved to fix inherited problems with the BRT although this led to delays in implementation that contributed to the extension of the project as shown by reallocation of unspent moneys in Variation 1 of September 2009.

13. Early intervention from the Institute for Transportation and Development Policy (ITDP) and Indonesian NGO partners prior to the project start helped to bring about public support for the BRT despite the challenges presented above, while technical support helped to fix some design shortcomings.

14. Although the earlier PDF-B grant provided outreach to Yogyakarta, the larger project was designed to extent outreach to a new regional city to be selected during the project. By late 2009, Pekanbaru, the capital of Riau, a province on the island of Sumatra, had been selected and outreach continued to 2011.

#### B. Objectives and components (goals and objectives)

15. The project was designed to address the key root cause of urban transport un-sustainability in Jakarta that was considered to be a dysfunctional transport pricing structure which de facto subsidises private motor vehicle use. Building on Jakarta's introduction of BRT, the project aimed to increase the effectiveness BRT services by increasing its capacity, speed, and the area of population served in order to dramatically benefit existing passengers and expand modal shift impacts.

16. By addressing local capacity shortcomings primarily through extensive assessment, technical assistance and training programs, the project aimed to improve the BRT system through optimising routing, infrastructure and traffic design, operations and public information. The project design was anticipated to be aided by two key factors: (i) the presence of a functioning BRT and the resulting urgency to learn how to improve and optimise it; and (ii) the popularity, despite its shortcomings, of the BRT system with the public.

17. Consequently, it was expected the improved BRT system would benefit existing passengers by reducing travel times<sup>19</sup> and attracting more BRT ridership in particular from private vehicles.

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<sup>18</sup> In 2008 the transport sector accounted for 80 Mt CO<sub>2</sub> 21% of the total GHG emissions from fuel combustion a decline from 2000 when transport represented 24.1% of total GHG emissions. The decline in transport's share was due to even faster growth in other sectors. CO<sub>2</sub> emissions from road transport grew by 24% from 2000 to 2008. Source: <http://www.internationaltransportforum.org/jtrc/environment/CO2/Indonesia.pdf> (accessed 23 December 2013) using International Energy Agency data.

<sup>19</sup> The project document puts emphasis on improving services of which total journey or travel time (consisting of access, waiting and in-bus travel time) and its variability are key components. Yet, the estimation of passenger travel time savings of the BRT were not required to be quantified by the project design.

Measures to manage travel demand would be promoted for Jakarta's central area<sup>20</sup> to provide additional incentives to shift from private motorised vehicles to BRT while pedestrian and NMT facilities and zones would be used to help promote land use change near the BRT corridors. With an improved and expanded BRT system, it was expected there would follow an improved public image setting the scene for further BRT expansion in Jakarta, as well as in other cities in Indonesia.

18. The project was organised into two main project goals and 9 objectives (described as components in the ToR for the TE) with associated outcomes as shown in Table 1, and each to be delivered by a set of 5-8 activities.

Table 1: Goals, Objectives and Expected Outcomes

Goals	Objectives	Outcomes
Goal A: Improve Performance of the Jakarta BRT	<b>1. Develop BRT corridors 4-14</b>	BRT implemented on corridors 4-14 with routes optimized
	<b>2. Optimize fare system for corridors 1-14</b>	Integrated fare system with controls stops fare leakage. Competitive contracting implemented for BRT bus operation, reducing costs
	<b>3. Improve intersection performance for BRT</b>	Intersection conflicts reduced to acceptable levels. BRT average speed increases to 25km/hr; improved political support for BRT by reducing impacts on mixed traffic
	<b>4. Optimize busway operation</b>	Increased average speed of BRT, 5% reduction of fleet downtime, reduced operating costs; 8% reduction in fuel consumption
Goal B: Utilize BRT to build image of public transport and improve pedestrian, TDM, NMT, and land use options	<b>5. Improve public information on BRT &amp; public transport</b>	Public understanding of BRT and optimal use of public road space increased. Web and SMS based routing information system available to potential passengers.
	<b>6. Rationalize non-BRT bus routes</b>	Increase of passenger from bus feeder system from 5% to 13% of BRT passengers; of which 32 % are new passengers and 32 % shifted from PMV feeder, reducing PMV feeder trips and increasing total BRT passengers
	<b>7. Evaluate and implement Transport Demand Management measures to reduce private motor vehicle use</b>	TDM measure implemented so that cost of PMV use is greater than BRT fare
	<b>8. Improve pedestrian and NMT facilities in centre and along corridors</b>	Convenient NMT and pedestrian facilities; increased feeder trips by bicycle
	<b>9. Dissemination and outreach to other cities</b>	Full BRT implemented in 1 of target cities; BRT draws some passengers from private motor vehicles.  Or increased number of students walking and biking to school / increased use of bicycle for short trips

Source: Project Logical Framework contained in Project Document Annex B

The first eight (of nine) objectives of the project focused on ensuring the success of the Jakarta BRT system, through its optimised implementation and expansion to a full system of 14 corridors, covering most of the city, during the project. Objective 9 focused on

<sup>20</sup> Initially, the NMT component of the project was planned for Yogyakarta, another major city on Java.

dissemination activities, in one other Indonesian city<sup>21</sup> to establish sustainable transport programs and transfer knowledge and other achievements gained in the Jakarta aspects of the project. Each activity was designed to complement the efforts of DKI Jakarta and provide funding for tasks which Jakarta was not able to do under a baseline<sup>22</sup> scenario.

### C. Target areas and groups

19. The target areas in the project document<sup>23</sup> are the city of Jakarta and other cities in Indonesia. The focus is modal shift, and use of clean fuels, in urban transport in keeping with GEF's Strategic Priority 6 within its Operational Programme 11 leading to a reduction in GHG emissions.

20. The project design aims to improve BRT services to reduce the time and cost of travel benefiting first existing BRT users who would be expected to be drawn from low income groups, and then potential car and motorcycle occupants who would switch to BRT, and implicitly, remaining road users who may benefit from improved traffic conditions.<sup>24</sup> The travel behaviour of these groups and their attitudes to BRT and public transport would be reflected in how they view the DKI Jakarta government and its politicians. Similarly, the views of politicians and the public in other regional cities would be targeted indirectly by Transjakarta's achievements and by direct project intervention in the chosen outreach city of Pekanbaru.

21. The project design identifies that the project would benefit the poor including vulnerable groups, elderly, persons with disabilities, and children. They would benefit from improved convenience, reduced exposure to accidents from improved bus, pedestrian, and cycle facilities<sup>25</sup>. Although gender was not mentioned in the project document, surveys show that 50% of all Transjakarta users are female (refer Annex 8). The same surveys show that only 15.1% and 13.4% of users were under the age of 20 and older than 40 years of age respectively.

### D. Milestones/ Key Dates in project design and implementation

22. The 16 original milestones and dates as set out in the Project Document by project objective<sup>26</sup> are summarised in Annex 4. These milestones were intended to indicate progress towards achievement of the project objectives by key contributing project activities and were defined broadly with achievement dates specified by year. These milestones were considered insufficiently detailed by the Mid Term Evaluation (MTE)<sup>27</sup> conducted during the first half of 2010<sup>28</sup>. The MTE

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<sup>21</sup> Planned to be selected during project implementation.

<sup>22</sup> Also known as a Business as Usual (BAU) or counterfactual scenario.

<sup>23</sup> UNEP-GEF (2006), "Project Document for Bus Rapid Transit and Pedestrian Improvements in Jakarta." Project Number: IMIS: GFL/2328-2723- xxxx; and PMS: GF/ 4010-06-xx.

<sup>24</sup> Assuming induced travel does not completely erode remaining road user benefits.

<sup>25</sup> UNEP-GEF (2006), op. cit, para. 169.

<sup>26</sup> Shown as components in Table 1 and defined later in the RTOC as 'direct outcomes.'

<sup>27</sup> UNEP Evaluation Office (2010), "Final Mid-term Evaluation Report on UNEP/GEF project GF/4010-01-01 (4960), Bus Rapid Transit and Pedestrian Improvements in Jakarta." Prepared by David Antell and Owen Podger, August.

recommended the adoption of 54 new milestones including those for two new objectives<sup>29</sup> to reflect actual project status and activities at the time with precise achievement dates. The new milestones are also set out in Annex 4 and were subsequently used for six monthly progress reporting over the final two and half years of the project.

### E. Implementation arrangements

23. UNEP had overall responsibility for the implementation of the project, project oversight, and co-ordination with other GEF projects. The Executing Agency for the project was ITDP who had worked with DKI Jakarta for two years previously. During the project, ITDP worked in close association with the relevant agencies of DKI Jakarta and a number of local and international NGOs via structured Memoranda of Understanding.

24. ITDP employed five locally-hired project staff. DKI Jakarta was to provide office space and two permanently assigned administrative staff. Office space was to be provided at a location most appropriate for the tasks that in practice were two offices, one at City Hall and one at Transjakarta's office at Cawang, the site of a former State-controlled bus depot. ITDP were required to report to the Project Steering Committee (PSC) which was intended to convene every six months but in practice met annually except in 2010 when it met three times<sup>30</sup>.

25. The PSC was composed of The Governor of Jakarta (PSC Chair), a representative from UNEP-GEF, one representative from each DKI Jakarta agency involved in the project, three representatives from Indonesian NGOs, and the Asia Regional Director for ITDP who were all full voting members. The PSC could also invite observers to its regular meetings (e.g. experts involved in the implementation of the project, representatives from other cities) to speak or report on certain aspects of the project.

26. The PSC was required to provide direction and guidance to the project, endorse proposed changes to project components, and approve progress, MTE and TE reports. In practice, the PSC was chaired usually by the DKI Jakarta's Regional Economic Secretary, a senior public servant. Attendees included representatives of the Transportation Agency, and other key agencies of DKI Jakarta including Planning (Bappeda), Public Works (Pekerjaan Umum), and Dinas Pertamanan (Parks), with frequent participation of NGOs and national agencies<sup>31</sup>. The governor never chaired the PSC meetings and only on one occasion was a Deputy Governor present. On at least one occasion in 2010, a separate meeting was arranged with the then Governor to report on key issues raised during the Steering Committee meeting of 25 June 2010 on the findings of the MTE.

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<sup>28</sup> The MTE rated the design of the Project Logical Framework 'Unsatisfactory' primarily due to a lack of milestones. However, the project implementation reporting was assessed as 'Satisfactory' by the MTE.

<sup>29</sup> The new objectives were: (i) the institutional improvement of Transjakarta; and (ii) the provision of an adequate supply and quality of CNG for BRT.

<sup>30</sup> Project records indicate the Steering Committee met on 17 December 2012, 22 December 2011, 23 December 2010, 25 June 2010 (time of MTE), 22 April 2010 with a Deputy Governor in attendance, 25 August 2009, 22 May 2008 and 13 July 2007.

<sup>31</sup> Ministry of Communications' Directorate of Urban Transportation attended twice and the police once.

27. Reporting to the PSC, the Project Management Unit<sup>32</sup> (PMU) consisting of ITDP staff, the two NGOs, staff assigned by DKI Jakarta that were all temporary project staff<sup>33</sup>, and staff from the other agencies of DKI Jakarta as appropriate, was designed to: (i) provide technical and operational guidance to the programme; (ii) coordinate expert assistance, training and workshop programs; (iii) implement surveys; and (iv) monitor and evaluate the progress of the activities and approve quarterly planning of activities. Additional experts were engaged on specialised topics during project implementation.

#### F. Project financing

28. The estimated project costs at design with associated funding sources, and end of project estimated actual costs, are presented in Table 2. Budgeted amounts by DKI Jakarta for project infrastructure and services were primarily for construction of the BRT (bus lanes, bus stations and pedestrian bridges and ramps), procurement of buses, other expenditures for construction of related pedestrian facilities, and payment for bus services. These budgeted amounts represent the cash financing item in Table 2<sup>34</sup>.

29. During the earlier project preparatory PDF-B phase, information was gathered on budget expenditures. The project proponents used a very conservative method to estimate co-financing by the City for BRT investments. Budgets are approved annually by the parliament between October and December for expenditure during the next calendar year. Budgets beyond 2006 were unknown during project design. For this reason, budget figures shown in Table 2 for the 5-year life of the project as designed were the actual 2006 annual Jakarta budget multiplied by two (instead of five). This approach was developed in cooperation with DKI Jakarta's Department of Planning (Bappeda).

30. At the end of the project that was extended by one year to 31 December 2012 when 12 corridors had been implemented as shown in Annex 1, the actual financing of infrastructure and administrative costs amounted to US\$419 million or 120% greater than planned, ITDP's in-kind contribution was 14% lower at \$89,000 and an estimated co-financing of US\$367,000 was mobilised.

**Table 2. Planned and Estimated Actual Project Cost**

Cost to the GEF Trust Fund			US\$	% Planned	% Actual
Project			5,812,000		
PDF-B <sup>35</sup>			348,300		
			<b>6,160,300</b>	<b>3.2%</b>	<b>1.4%</b>
<b>Co-financing planned</b>	<b>In-Kind</b>	<b>Cash</b>	<b>Total</b>		

<sup>32</sup> PMU is a misleading term as all key coordination, implementation and procurement decisions were in fact made by DKI Jakarta agencies.

<sup>33</sup> Communication from ITDP Jakarta on 24 December 2013.

<sup>34</sup> DKI Jakarta built the first BRT corridor at its own expense and without financial assistance of any kind and almost entirely financed corridors 2, 3 and 4 that were completed by the commencement of the project.

<sup>35</sup> Project preparation grant approved by UNEP 21 October 2005 and GEF 6 March 2006 for six month duration support to Jakarta DKI and Yogyakarta Municipality to support implementation of corridors 1-3 of Transjakarta and similar improvements in Yogyakarta.

ITDP	-	104,000	104,000		
Government of Jakarta	210,000	187,661,000	187,871,000		
Other*	-	-	-		
<b>Sub-total planned co-financing</b>	<b>210,000</b>	<b>187,765,000</b>	<b>187,975,000</b>	<b>96.8%</b>	
<b>Total planned project cost</b>			<b>194,135,300</b>	<b>100.0%</b>	
<b>Actual co-financing</b>	<b>In-Kind</b>	<b>Cash</b>	<b>Total</b>		
ITDP	-	89,000	89,000		
Government of Jakarta	210,000 (assumed)	419,000,000	419,210,000		
Other*	-	367,000	367,000		
<b>Sub-total actual co-financing</b>	<b>210,000</b>	<b>419,456,000</b>	<b>419,666,000</b>		<b>98.6%</b>
<b>Total actual project cost</b>			<b>425,826,000</b>		<b>100.0%</b>

(\*) Contributions for venue hire and associated meal and related expenses for workshops and the like mobilised from 24 agencies as follows: (i) two national government agencies; (ii) six Jakarta DKI agencies including Transjakarta; (iii) city government of Pekanbaru, (iv) one bilateral development enterprise; (v) six local NGOs; and (vi) eight local firms. Agency details shown in Annex 3.

## G. Project partners

31. The key project partners were the agencies of the DKI Jakarta Government: DisHub for bus fleet and bus service procurement, building of stations, and traffic management and control; (ii) Transjakarta (a sub-division of DisHub) as the BRT system manager; (iii) Pekerjaan Umum for development of rapid transit pavements for BRT and some footpath construction; (iv) Bappeda for developing forward implementation plans, and (vi) Dinas Pertamanan for treatment of walk-in catchments to stations. These were identified in Figure 7 of the project document. In practice, BRT bus operators and national agencies such as Pertamina the national government-owned corporation responsible for CNG supply, and Ministry of Energy and Resources responsible for regulating CNG pricing and supply were very important but were not identified at project design. The two NGO partners that worked with ITDP, the executing agency, had been identified at project design but played only minor roles during implementation.

## H. Changes in design during implementation

32. The project design suffered from a major drawback. The executing agency ITDP did not control the key factors affecting implementation of physical facilities, procurement of bus services, enforcement of bus lanes, implementation of pedestrian facilities, provision of related budgets, or the related transport policy environment. The risks inherent in the project as designed were inadequately identified leading to achievements of direct outcomes that were less than intended. The project design did however identify that 'political will' and 'public acceptance' were key risks.

33. Political commitment was assessed as very high at the time of the project design during 2006. The project document described Transjakarta as a "publicly-controlled private corporation under legal control of DKI Jakarta" and "fare revenues and operations are nominally controlled by Transjakarta."<sup>36</sup> As a result, there appears to have been the inherent assumption that Transjakarta already had the necessary autonomy and legal status to successfully operate BRT with the support of

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<sup>36</sup> Project Document, paras. 174 and 175, page 40.

the project. In fact, at project design Transjakarta was a sub-division under DKI Jakarta's Transportation Agency<sup>37</sup> and unable to control revenues, procure bus services directly, or provide infrastructure. It also did not have sufficient staff to manage bus contracts and monitor bus operations. In recognition of the imperative to greatly upgrade the legal status and functional capacity of Transjakarta the Mid Term Evaluation report of August 2010 recommended the creation of a new objective entitled "Institutional Improvement of Transjakarta" seeking the creation of a company owned by the Jakarta Government by July 2011<sup>38</sup>. Similarly, the quality and availability of an adequate supply of compressed natural gas (CNG) was not identified as a problem in the project design but by December 2009 was identified by ITDP's then six monthly progress report as the main operational problem. Following the MTE, the new objective "Provide adequate supply and quality of CNG for BRT" was added.

34. The technical review undertaken under the auspices of GEF's Scientific and Technical Advisory Panel (STAP) contained in Annex 3 of the Project Document commented primarily on technical matters not on the political, institutional and public acceptance aspects that in fact heavily influenced project implementation and achievement of outputs and outcomes. The evaluators of this TE were not provided with comments made by UNEP management on the project design at the time of approval. It appears that the project approval committee minutes were lost during the hand-over between the first and second UNEP Task Manager.

35. However, as early as the end of 2007 (year 1), the institutional impediments were recognised<sup>39</sup>. With a change in Governor in October 2007, and less visible commitment, a major change of emphasis occurred thereon whereby \$600,000 representing 10% of the project budget were redirected to: (i) development of Minimum Service Standards; and (ii) provision of legal and institutional strengthening advice on restructuring Transjakarta to a DKI Jakarta owned company, a BUMD, with control of its own budget. The project design ideally would have identified in advance of project approval the institutional constraints that could hinder implementation (and still remained at the close of the project in December 2012). Project activities could have been more appropriately structured at the time. Project support did assist DKI Jakarta to establish the full BLU by 2010 (refer footnote to para. 33) – something the MTE described as an "extraordinary achievement" given national enabling regulations were only developed by mid 2007<sup>40</sup>. On 30 December 2013, one year after the close of the project, DKI Jakarta's parliament passed the local law for conversion of Transjakarta to a BUMD.

36. Despite the major change in emphasis, a minor administrative revision in September 2009, and an extension of the project by one year (to end 2012), this TE considers that the fundamental project design was not changed during project implementation. A fundamentally different approach to

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<sup>37</sup> Called a Badan Layanan Umum (BLU)/ Unit Pelaksana Technis (UPT) by Governor Decree No. 48 2006 (dated 4 May). It could not retain revenue for use in purchasing bus services and instead revenues were remitted to DKI Jakarta's central revenue. In 2010, Transjakarta was converted to a full BLU, under Decree 626, that permitted establishment of its own bank account and use of fare revenues for purchasing BRT operations.

<sup>38</sup> Known as a Badan Usaha Milik Daerah (BUMD). As a BUMD with an appropriate legal basis and functional span of responsibility, and adequate resources, with autonomy in day to day decision making, it was considered this was the only way to successfully transform BRT operations. MTE (2010) on pages 31 and 32 confirmed the desirability of creation of a BUMD.

<sup>39</sup> Personal communication on 23 November 2013 with John Ernst, ITDP's Project Director to mid 2011.

<sup>40</sup> MTE (2010), page 200.

design might have made project assistance conditional on substantial institutional changes being made prior to the commencement of the project<sup>41</sup>. Implementation of the project activities was flexible, but these are assessed as tactical not strategic or fundamental changes, and able to respond to changing circumstances which were considerable. This flexibility is assessed as a strength in this situation.

### I. Reconstructed Theory of Change

37. The project document's Logical Framework<sup>42</sup> did not articulate intermediate states linking the achievement of outcomes to the project's two goals and the global objective. However, the project design demonstrated an understandable link between objectives, outputs and outcomes that are summarised in Annex 4.

38. The ToR for the TE required a reconstruction of the Project's intervention logic or Theory of Change. UNEP currently utilises the following terminology<sup>43</sup>: (i) outputs: products and services delivered by the intervention; (ii) direct outcomes: changes occurring as a result of the use of outputs; (iii) intermediate states: step-wise changes required before direct outcomes lead to impact; and (iv) impact: changes in environmental benefits, corresponding to the GEF's global environmental objective. Here, the two project goals are considered to be an intermediate state. Also required to be considered are: (i) assumptions: any external factors affecting change at different results levels outside the project's control and (ii) drivers: external factors affecting change that the intervention can influence.

39. Immediate or direct outcomes, longer term outcomes and intermediate states can be distinguished. With direct outcomes, there is a direct link between them and the project outputs. They are often capacity building outcomes. Longer term outcomes are often behavioural changes<sup>44</sup> where stakeholders may fundamentally change the way they behave with expected positive effects on the environment.

40. Based on the review of the project's original Logical Framework and how it was actually implemented at the beginning of the project, and changes made during the project to reflect changed circumstances, a Reconstructed Theory of Change (RToC) was prepared as shown in Annex 5. The RToC is readily related to the original project design while the numbering system for objectives follows the one developed following the MTE. This RToC confirms that the original Logical Framework was fundamentally sound but causality was not articulated and identification of risks was incomplete.

41. The RToC that is shown in Annex 5 identifies one 'longer term outcome.' This outcome assumes that timely implementation of all aspects of the BRT and its services and associated

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<sup>41</sup> As was done for Jakarta's Mass Rapid Transit project that commenced construction in late 2013 where a BUMD had to be created as a pre-condition of assistance.

<sup>42</sup> Annex B of the project document.

<sup>43</sup> UNEP Programme Manual (2013). The current terms differ from those used in: (i) the Project Document main body and Annex 2 (LogFrame); (ii) Project Implementation Reports and Progress Reports; (iii) language used in the MTE; and (iv) terminology used in the 2008 UNEP Evaluation Manual.

<sup>44</sup> For example, impacts due to patronage increases due to improved services that may lag the actual improvements due to the phenomenon of 'ramp-up' where potential passengers need time to become aware of service changes and learn how to use them and budget for their use.

supporting facilities (e.g. NMT) would result in creation of a 'BRT and feeder system' that would be expected to be attractive to passengers, and therefore achieve a favourable demand response (meet patronage expectations). As there was progressive implementation, and retrofitting of various BRT corridors during the project implementation, in fact, this longer term outcome may have been partially achieved in some corridors during project implementation. The assumptions, drivers and indicators were selected appropriately.

42. Through effecting favourable behavioural changes, the aim was to create a virtuous circle of improvement through: (i) facilitating the longer term outcome that urban travellers have a functioning and attractive BRT system with BRT services integrated with other urban transport means; (ii) in turn leading to achievement of Intermediate States 1 whereby the image of public transport and NMT is improved and car and motorcycle drivers and passengers find BRT including feeders an attractive alternative to driving; and (iii) that, in turn, a positive reputation motivates more travellers to choose the more efficient integrated urban travel options provided by public transport and NMT.

43. Achievement of the project goals was intended to achieve what the project design document termed the project objective "...to maximize the effectiveness of Jakarta's BRT system and use it as a catalyst for urban transport reform in Jakarta and other key Indonesian cities." Success up to this point leads to the achievement of the impact which is the project's global environmental objective at the city-level: reducing greenhouse gas emissions from urban transportation. An important co-benefit was implicitly assumed to be an improvement in air quality with improved health outcomes.

44. The achievement of outputs and direct outcomes are assessed in detail in Annex 6 and compared as necessary to available information on the baseline<sup>45</sup> as set out in the Project Document (summarised in Annex 4). To answer the key questions identified by the ToR, in particular on a quantified achievement of a switch from private modes and reduction of GHG and local emissions that give rise to air pollution, requires quantifying the identified indicators (that contribute to intermediate state 1 and the impact). These indicators are assessed in paragraphs 55-57 and 69-72.

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<sup>45</sup> For most indicators, the baseline measurements will be at the project commencement whereas GHG estimates are made against a dynamic 'Business as Usual' case.

## IV. Evaluation Findings

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### A. Strategic Relevance

45. The project's global objective, two goals and implementation strategies were consistent with sub-regional priorities as evidenced by Indonesia's first National Communications on Climate Change in 1999 under the United Nations Framework Convention on Climate Change (UNFCCC). It was also consistent with the 2007 National Action Plan on climate change (2007) prepared by the National Council on Climate Change that is tasked to coordinate climate change mitigation and adaptation activities within Indonesia.

46. The project was designed to take advantage of UNEP's comparative advantages and expertise within the framework provided by the UNEP-GEF Action Plan on complementarity for UNEP-GEF interventions. It was therefore aligned with the following key UNEP intervention principles: (i) development and demonstration of tools and methodologies; and (ii) strengthening the enabling environment so that countries can more effectively implement measures consistent with the UNFCCC<sup>46</sup>. The project was designed to share information with the Clean Fuels and Vehicles Partnership and UNEP-GEF BRT projects in Tanzania and Columbia. Transjakarta and DKI Jakarta officials undertook a study visit to Transmilenio, the BRT in Bogota, Columbia, early in the project.

47. The project global objective and goals were also consistent with: (i) GEF's Operational Program on Sustainable Transport (OP11) as evidenced by the review by GEF's Scientific Advisory Panel that endorsed the use of BRT as a low cost transit option<sup>47</sup>; and (ii) other GEF activities globally including the Bus Toolkit and a then proposed GEF project in Surabaya, Indonesia.

48. The project design was consistent with UNEP's "Bali Strategic Plan for Technology Support and Capacity-Building" of 2004 on: (i) thematic areas of relevance – climate change and pollution; and (ii) the basic approach of the plan: (a) efforts should build on existing capacities; (b) activities under the plan must have national ownership to ensure that built capacities are sustained; and (c) capacity-building programmes must be tailored to individual countries based on a bottom-up needs-assessment.

49. Although the project's global objective and its two goals had a strong rationale expectations of their substantial achievement were unrealistic given the flaw in project design. The RToC confirms the project's outputs omitted a key output on institutional support from the project outset. But even with the re-orientation of the project activities to provide institutional and legal support, there was only limited improvement in institutional capacity by the end of the project although the legal status had considerably strengthened<sup>48</sup> as shown in Annex 6.

**Evaluation rating:** Satisfactory.

### B. Achievement of Outputs

50. A summary of the extent of achievement and the ratings of the 11 outputs in the RToC corresponding to the nine objectives set out in Table 1, plus the two new objectives, were completed

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<sup>46</sup> Refer Project Document para. 61.

<sup>47</sup> Refer Annex C of the Project Document.

<sup>48</sup> By 2010, Transjakarta could retain fare revenue and by 2011 could own assets and had increased authority on paper to plan and manage bus operations although the key control was maintained by DisHub.

largely as planned. Details are provided in Annex 6. The satisfactory level of achievement is not surprising because outputs were largely feasible, being of an advisory nature consisting of technical advice, preparation of reports and provision of training. The two new outputs 'A2.b Advice on support for establishment of Transjakarta provided' and 'A.3.b. Advice to improve CNG supply provided' were added during MTE in response to the project team's earlier appreciation of Transjakarta's actual legal basis, its capacity and institutional constraints, and the inadequacy of the CNG supply respectively. The choice of outputs was appropriate to achieving the direct outcomes with the caveat that the advisory nature of the project design meant that the project team had no control over their implementation.

**Evaluation rating:** Satisfactory.

### C. Effectiveness – Attainment of Project Objectives and Results

#### (i) Direct outcomes from reconstructed TOC

51. A detailed assessment of the achievement of direct outcomes as identified in the RToC is set out in Annex 6. The ratings and their justification are also included in Annex 6 and summarised in Table 3 below. They observe the guidance on ratings provided in Annex 6 of the ToR for the TE evaluation (refer Appendix 12). Three of the 11 direct outcomes, corridors (A.1), CNG supply (A.3b) and outreach (B.9) achieved an 'S' (satisfactory) rating indicating they were largely achieved as planned. Three achieved an 'MS' (moderately satisfactory) rating indicating the basis for their full functioning has been laid but actual achievement is at an early stage or yet to start, and there are some doubts or limitations to their full achievement in the future. These were: (i) establishment of Transjakarta as a BUMD (A2.b); (ii) implementation of travel demand management (A.7), and (iii) implementation of pedestrian and NMT facilities in other cities (B.8). Five out of 11 direct outcomes were rated in the unsatisfactory zone. Improvement of passenger information (B.6) and feeder services (B.7) achieved an 'MU' (moderately unsatisfactory) rating. The ticketing system (A2.a) is unsatisfactory since it doesn't follow ITDP's recommendations and is unsuitable for transit operations. Intersection conflicts (A3.a) have hardly been reduced since little attempt has been made at reducing delays to buses at intersections. Bus services (A.4) have not been optimised since declining service quality, service irregularity and crowding have not been resolved. Overall, when assessed strictly against the project objectives and desired outcomes the rating would be 'MU'. However, in recognition of the challenging circumstances faced during project implementation and the likelihood that further progress on some direct outcomes will be made in the near future<sup>49</sup>, the final rating for achievement of direct outcomes is 'MS.'

**Evaluation rating:** Moderately Satisfactory.

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<sup>49</sup> Most notably, in May 2014, a Gubernatorial Decree on Minimum Service Standards for the BRT system was approved and a major electronic road pricing trial was announced to be started in July 2014.

**Table 3: Ratings for Achievement of Direct Outcomes and Justification**

Direct Outcomes	Outcome Rating (*)	Justification/ summary of assessment in Annex 6
A.1 BRT corridors 4-14 completed & functioning well	S	12 corridors implemented, 2 below target. Quality generally 'basic' according to ITDP rating system.
A.2a Optimised ticketing system functioning	U	Partial ticket system implemented but not according to ITDP specification. System is too slow for transit operation & likely not sustainable.
A.2.b Transjakarta is established as a fully functioning capable company	MS	BUMD, a government owned company, was established in January 2014, much later than intended, and questions remain about its efficacy given incomplete use of potential of earlier organisation structures. Nevertheless, it is a very positive step.
A.3.a Intersection conflicts reduced along BRT corridors	U	Little attempt at shortening signal cycle times to reduce delays has been attempted although the new ITS centre may offer potential.
A.3.b. Adequate CNG supply is conveniently available	S	Access to CNG stations has greatly improved but losses in bus revenue-earning time of 2 hours/ day still exist.
A.4 BRT services optimised	U	Services are poorly managed by bus operators and Transjakarta does not show any obvious signs of trying to rectify the situation. The result is irregular crowded buses with long waiting times for passengers. Bus control centre has not been implemented as planned.
B.5 Information/awareness on BRT & other PT is enhanced	MU	Static passenger information exists. BRT stations are visible. BRT routes are comprehensible to the public. But the quality of information is deteriorating with little attempt shown by Transjakarta to maintain a common signature.
B.6 Feeder services to BRT operated in all corridors	MU	Bus services that existed before BRT were not completely withdrawn due to the project's efforts. New direct feeder services were introduced but not according to the recommendations of ITDP.
B.7 Travel demand management is implemented	MS	Parking legislation was prepared and partially implemented. National legal authority for road pricing was established but local enabling

Direct Outcomes	Outcome Rating (*)	Justification/ summary of assessment in Annex 6
		legislation has yet to be promulgated.
B.8 Pedestrian/NMT facilities improved in Jakarta/ other cities	MS	A good attempt at improving pedestrian access to BRT stations in Jakarta was made with the project's assistance. But prevailing physical constraints limited the impact. Some attempts at improving pedestrian facilities in Pekanbaru and other cities was made.
B.9 Outreach & dissemination result in commitment to implement BRT/ NMT in 1 city	S	Outreach to Pekanbaru was fairly successful with a second BRT corridor implemented with project support.

**Note on ratings:** a rating of HS – MS means the criterion was overall in the satisfactory zone. HS means it was excellent, S means it was broadly satisfactory, and MS means that it was broadly satisfactory but there were some problems requiring attention. HU-MU means that the criterion was overall in the unsatisfactory zone. HU means very poor, U means poor, while MU means broadly poor but with a few positive points.

## (ii) Effectiveness issues related to outcomes

52. The specific issues identified in the ToR for the TE are addressed below, supplemented by a discussion of the effectiveness of the project in facilitating travel time and welfare benefits, Transit Oriented Development and the effect on modal choice (i.e. choice of transport means) in Jakarta.

- **Creation of an expanding BRT network but ‘system’ elements are deteriorating.** As shown by the achievement of the direct outcomes, at the close of the project as observed by the TE, BRT's system components, and quality of bus services offered to bus users, were in decline with: (i) long standing bus operational reliability problems unresolved with limited day to day management of on-road bus operations to minimise gaps in service or give priority to buses; (ii) inadequate capacity of transfer stations; (iii) inconsistent branding and public information; (iv) introduction of Kopaja mini-buses with different livery, poor on road driving behaviour, and higher fares; and (v) as a consequence, declining patronage even as the system has been expanded. Further, stakeholders consulted during the TE, did not demonstrate there was a strong commitment to resolving these systemic problems.
- **The lack of a focus on users or customers of the BRT system extended to the technical analysis undertaken by the project.** Success in reducing GHG emissions would in fact rely on the project effecting significant changes in traveller behaviour due to the travel time advantages provided by BRT as shown in the RToc. Significant travel time savings would be expected to enhance the accessibility of activity centres located near BRT stations maximising the potential for the fostering of Transit Oriented Development (TOD). It does not, for example, appear that estimates of travel time savings for Transjakarta passengers have been estimated in a comprehensive manner<sup>50</sup>. Instead the focus was only on GHG reductions. Refer Annex 6 for details.

<sup>50</sup> None of the project documentation provided to the TE team, estimates the average travel time saving to BRT passengers. This is surprising as travel time is the key component of standard measure of economic benefit or

- **Pedestrian and TOD improvements were enhanced by the project.** While the project directly influenced the form of the pedestrian treatments at all stations through the BRT design manual, training and advisory services the most significant pedestrian treatment was the creation of a small pedestrian zone at Plaza Fatahilih nearby Kota BRT station. Pedestrian connections were built by private developers at S. Parman Podomoro City station on Corridor 9 and at station Salemba Carolus on Corridor 5. The Podomoro City Super Block was evaluated by ITDP in May 2013 and found to meet their definition of a Transit Oriented Development<sup>51</sup> that covered walkability and bicycle-friendliness, the quality of adjacent streets and shop frontages, and urban form and density. However, it is recognised that this development was not created by the BRT but instead took advantage of the proximity of the BRT to increase its attractiveness in the market. Refer Annex 6 for details.
- **E-ticketing system was introduced in 2013 but is too slow for rapid transit operations.** ITDP provided advice on best practice in e-ticketing for public transport operations reliant on procurement by competitive tender of a system with fast transaction times and other desirable features of modern ticketing. However, after two failed attempts at e-ticketing during the project, DKI Jakarta subsequently allowed a consortium of banks to implement a ticketing system at their own cost under a five year contract. Unfortunately, the ticketing system has transaction times of greater than one second per passenger much slower than the 0.2 seconds per passenger or less that are required for transit operations<sup>52</sup>. Usage is low at a reported 5% of daily patronage and there are questions about the system's flexibility and sustainability<sup>53</sup>. Refer Annex 6 for details.
- **Limited progress has been made with travel demand management.** The off street parking regulation designed to cap the maximum number of car parking spaces in developments was brought into law in September 2012. But the regulation to encourage space turnover and modernise the method of fee collection had not been implemented at time of the TE. Further, changes in spatial distribution and temporary allocation of parking spaces and their pricing would in the absence of other traffic restraint measures merely be expected to redistribute car travel not reduce it. In terms of more comprehensive road pricing, national enabling laws have been adjusted including provisions in the national Road Traffic and Transport Law [22/2009] and Government Regulation (97/2012) was issued in October 2012 which added a Road Traffic

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welfare. The magnitude of travel time savings is also a key determinant of reductions in GHG and air pollution. Average on road bus speeds were observed as 16 kph in November 2010 by the feeder bus study. End of project BRT speeds were observed at 20 kph. For the average end of project, BRT pax. trip length of 13.2 km, a very crude estimate of the average travel time reduction for a former bus passenger that can use a BRT service between the same origin and destination, would be 10 minutes i.e.  $[13.28 (1/20-1/16)*60] = 9.9$  minutes, say 10 minutes per passenger. No unit time savings benefits for MRT were available to the TE team to enable a comparison with MRT.

<sup>51</sup> ITDP. Transit Oriented Development Guide, Version 1.

<sup>52</sup> The technology is designed for use in convenience stores where ultra fast transaction times are not required.

<sup>53</sup> It is probable that the technology could not easily adapt to say a distance based pricing regime. Sustainability is an issue as there no assurance that the Bank's would agree to upgrade and expand the system to meet the future capacity needs of BRT.

Fee (Retribusi Pengendalian Lalu Lintas. DKI Jakarta's parliament has yet to promulgate a local law authorising road pricing<sup>54</sup>. Refer Annex 6 for details.

- **Non motorised transport has been assisted in a minor way by NMT improvements promoted by the project.** The most major achievement was the North Jakarta bike lane but surveys of usage have not been undertaken by the project or DisHub. Surveys undertaken in November 2010 show that 0.6% of passengers access BRT stations using bicycles (approximately, 2,000 pax/day in 2012). Refer Annex 6 for details. The TE's surveys in January 2013 confirmed this level of NMT access to BRT (refer Annex 7).
- **Transjakarta itself had a major impact on transport policy in other regional cities.** At least 13 regional cities<sup>55</sup> at the close of the project were estimated to have been influenced by the Transjakarta model. This influence had begun by time of project design as shown in the project document. The extent of additional influence of the UNEP-GEF project is not known precisely but is likely important. Refer Annex 6 for details.
- **A BRT system operating below potential is unlikely to significantly change public transport's modal share.** The TE's surveys undertaken in January 2014 found that as shown in Annex 7 that without BRT the percentages of alternative use of modes would have been: 71.9% ordinary bus;<sup>56</sup> (ii) 2.7% car driver;(iii) 2.6% car passenger; (iv) 11.7% taxi/ojek/bajaj; (v) 6.8% motorcycle driver; (vi) 1.9% motorcycle passenger; (vii) 0.3% walk; (viii) 0.3% bicycle; and (ix) 1.8% of trips would not have been made. On this basis 15% of the 390,000 daily BRT passengers at the end of 2012 were former car or motorcycle occupants indicating that approximately 60,000 additional public transport trips were made per day at the end of the project compared to the Baseline in 2012 without the project. In 2002, public transport modes were estimated to represent 60% of the 34 million daily person trips by SITRAMP and by 2010 in the baseline the percentage of public transport trips was estimated to decline to 55% of the projected daily trips of 45 million daily trips. That is, in 2002, public transport trips were estimated to represent 20.4 million trips per day and by 2010 they were estimated to grow to 24.75 million trips per day due to rapid growth in travel demand, despite the declining share of public transport. Viewed against the forecast baseline growth of 4.35 million person trips per day, the project is estimated to have contributed an additional 60,000 daily trips or 1.3% of the growth from 2002 to 2010 but this only represented 0.24% of total daily public transport trips.
- **Jakarta's BRT is cost effective.** The project's investment of \$5.9 million supported a major co-financing of DKI Jakarta of \$419 million that was 124% higher than anticipated at project design. While eight corridors (4-11) were added by project close in December 2012 totalling

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<sup>54</sup> A major Electronic Road Pricing trial was announced in May 2014 to be started in July 2014.

<sup>55</sup> Advice from Hans Furkhe, Team Leader of GIZ's Sustainable Urban Transport Improvement Project, situated at Bappenas, the national economic planning agency. The status of BRT-like implementation in these cities during 2012 was Pekanbaru (2 corridors), Bandung (1 corridor), Batam (1 corridor), Semarang(1 corridor), Manado (2 corridors), Gorontalo (4 corridors), Sarbagita (1 corridor), Ambon (1 corridor), Tangerang (1 corridor), Yogyakarta (6 corridors), Surakarta (1 corridor), Bogor (3 corridors), and Palembang (5 corridors).

<sup>56</sup> Surveys undertaken by TransJakarta show that from year to year about 70% of surveyed BRT users stated that ordinary bus was the alternative mode. However, data from ITDP's GHG emission reduction calculations report the following surveyed alternative modes in 2012: 43.9% bus; 10.3% car; 5.3% taxi; 24.9% motorcycle; and 15.6% other.

136 km, compared to the desired 11 new corridors,<sup>57</sup> the total BRT length at project close was 180 km with patronage of 390,000 pax/day (2,170 pax/km) compared to 114,000 pax/day (or 2,600 pax/km) in 2006. That is, BRT patronage during the project increased by 242% although productivity measured in terms of pax/km of BRT declined by 16%<sup>58</sup>. At DKI Jakarta's estimated historic capital investment in BRT of \$3.5 million per kilometre the entire 180 km BRT system that carried 390,000 pax/day at project close is expected to have had an approximate capital investment of \$640 million in then current prices (likely approximately \$800 million to \$1 billion in 2014 prices). Compared to rail MRT systems such as that first phase of the 15.7 km first phase Jakarta MRT<sup>59</sup> at a cost of \$1.5 billion or more, and may carry lower demand in its opening year than the current forecast of 200,000 pax/day due to ramp-up,<sup>60</sup> the Jakarta BRT is quite effective. However, the quantity of unit-benefit per BRT and MRT passenger would also have to be compared to make a comprehensive comparison but the necessary information is not available. Compared to other modern BRT systems, Transjakarta performs less favourably. At end 2006 the time of the project's commencement, Bogota's TransMilenio consisted of 250km of BRT track, and carried 350 million passengers/year or over 1 million pax/day representing 4,000 pax/km or 100% higher than Transjakarta at the close of the project<sup>61</sup>.

### (iii) Likelihood of impact based on the Reconstructed TOC using ROTI

53. The rating scale for outcomes in terms of forward linkages and progress towards intermediate states and impact is presented in Table 4 below. Table 5 presents the actual ratings given to the project outcomes by the evaluation. Seven out of 11 direct outcomes were largely delivered and designed to feed into a continuing process towards intermediate states and impact (rating 'B'). The construction of BRT corridors (A.1) by DisHub is largely achieved despite quality issues, and is part of their normal business now. Approval of conversion of Transjakarta to a BUMD (A.2b) has been achieved very recently but the company will take time to be fully functional and effective and considerable challenges remain. CNG is supplied (A.3b) by other public agencies but planning and installation of new CNG stations is not under the control of Transjakarta. Pedestrian and other NMT facilities have been improved in Jakarta (B.8) and there is an on-going program to pursue this despite considerable physical constraints. Information and awareness on BRT and other public transport means have been enhanced (B.5) as were, partially, feeder services towards the BRT corridors (B.6). The creation of the BUMD offers potential for improving further these two aspects. Outreach and

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<sup>57</sup> The objective was to implement corridors 4 to 14 but corridors 4-7 were opened as the project commenced. Projects 8-11 were implemented during the project with Corridor 11 opening in 2011. Corridor 12 was opened in January 2013. In the analysis, only 11 corridors as operated at the end of the project were considered as patronage figures were available.

<sup>58</sup> SDG (2011), op. cit. page 50 reported that patronage on corridor 1 represented more than 80,000 pax/day or 30% of daily ticket sales but other corridors had much lower patronage in the range 17,000 to 36,000 pax/day.

<sup>59</sup> That commenced construction in October 2103. Phase 1 from, from Lebak Bulus in Southern Jakarta to the Hotel Indonesia traffic circle in Central Jakarta overlaps Corridor 1 of Transjakarta. Refer [[http://en.wikipedia.org/wiki/Jakarta\\_Mass\\_Rapid\\_Transit](http://en.wikipedia.org/wiki/Jakarta_Mass_Rapid_Transit)] accessed 26 December 2013.

<sup>60</sup> In the section on reconstructed Theory of Change, a description of ramp-up is provided.

<sup>61</sup> Grütter J. (2007), "The CDM in the Transport Sector. Module 5d of Sustainable Transport: A Sourcebook for Policy Makers". German Technical Agency, Eschborn, 2007, page 21-23.

dissemination (B.9) are taking place because the Transjakarta BRT system – despite its shortcomings – represents a significant local achievement that is being emulated in other cities.

54. Travel demand management (B.7) was partly improved through (partial) parking measures but will likely have little impact as these measures can be expected to redistribute demand as mentioned in para. 52 (rating 'C'). Three direct outcomes were not achieved (rating 'D'). Bus services were not significantly optimised (A.4) even though the creation of a BUMD may offer potential for improvement although inconvenient access to CNG stations and intersection delays are limiting factors. Further, bus contracts have been recently renewed without substantial modification likely for the balance of their seven year contract periods. The poor record with ticketing (A.2a) and the constraint of a five year concession means improvement of ticketing is unlikely in the near term. The enforcement delivered post project and new ITS centre offer some opportunity for reduction in delays along BRT corridors (A.3a) but the track record for reduction of delays is poor with little prospects for improvement. Improvements in cost recovery require increasing fares in real terms but without substantial service improvements patronage would be expected to decline along with global environmental benefits.

55. Achievement of the global environmental objective depends primarily on the reduction in GHG emissions and particulate matter from the transfer of drivers or cars and motorcycles to the BRT. The project's estimated GHG emissions reduction in 2012 was 54,000 tonnes or 0.18 tonnes (reduced annually) per daily BRT passenger. As shown in Annex 9 these estimates of annual GHG reduction per daily BRT passenger were consistent with the experience from the two approved CDM BRT projects, TransMilenio in Bogota, Columbia and Metrobus, in Mexico City, Mexico. However, the TE's assessment contained in Annex 9 found that some components of the estimated GHG saving were likely overestimated such as that due to switching from car and taxi. Estimates of GHG reduction due to increases in cycling and walking improvements were not made by the project.

56. Quantified GHG reductions<sup>62</sup> at close of project were targeted to be an incremental 263,000 tonnes/annum for an additional 600,000/day over that due to corridors 1-3 alone. As shown in Annex 1, end of project patronage was 390,000 pax/day for 11 corridors<sup>63</sup> totalling 180 km with estimated GHG reductions of 60,000 tonnes/annum<sup>64</sup> compared to the 114,000 pax/day for the 44 km long corridors 1-3 just prior to the commencement of the project with GHG reductions of 20,000 tonnes/annum. The actual project achievement was therefore an incremental increase in demand of 276,000 pax/day and 40,000 tonnes/annum of incremental GHG reduction noting that corridors 4-7 were opened just as the project commenced in January 2007. The actual achievement in reduction of GHG emissions was just under one half of the desired increase in patronage and one sixth of the targeted GHG reductions using the project's method of estimating GHG reductions (refer Annex 6).

57. Patronage declined from 2011 to 2012 as shown in Annex 1 likely to poor BRT performance. Passenger attitudes assessed at close of the project by Transjakarta found that passengers rated the following attributes of BRT as generally poor with details as follows: drivers (poor); officers (very

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<sup>62</sup> CO<sub>2</sub>-equivalent/annum.

<sup>63</sup> Here we use the actual 11 project corridors that were open at December 2012 since daily demand estimates relate to these 11 corridors.

<sup>64</sup> Broadly confirmed by the TE as shown Annex 9. Note the estimate of 2012 GHG reductions reported in technical calculations was 53,000 tonnes.

poor); infrastructure (very poor); buses (very poor); operations (good)<sup>65</sup>; and ticketing (poor). The TE's own surveys found that a key main attribute that BRT passengers preferred about the service was its low fare but 48% considered waiting times to be 'very long' or 'long' indicating problems with BRT service regularity and reliability (refer Annex 7). The generally poor attitudes of BRT passengers to the services they receive underlines the significant challenges facing Transjakarta in its future efforts to increase performance and patronage and achieve environmental goals.

**Table 4. Rating Scale for Outcomes and Progress Towards Intermediate States**

<b>Outcome Rating</b>	<b>Rating on progress toward Intermediate States</b>
D: The project's intended outcomes were not delivered	<b>D:</b> No measures taken to move towards intermediate states.
C: The project's intended outcomes were delivered, but were not designed to feed into a continuing process after project funding	C: The measures designed to move towards intermediate states have started, but have not produced results.
B: The project's intended outcomes were delivered, and were designed to feed into a continuing process, but with no prior allocation of responsibilities after project funding	B: The measures designed to move towards intermediate states have started and have produced results, which give no indication that they can progress towards the intended long term impact.
A: The project's intended outcomes were delivered, and were designed to feed into a continuing process, with specific allocation of responsibilities after project funding.	A: The measures designed to move towards intermediate states have started and have produced results, which clearly indicate that they can progress towards the intended long term impact.

58. In terms of progress towards intermediate states and impact, only two out of 11 outcomes received a 'B' rating – results at intermediate state level can be seen but with no evidence of impact so far. These are that adequate CNG supply is conveniently available (A.3b), and outreach and dissemination result in commitment to implement BRT/ NMT in one additional city (B.9). Four direct outcomes that are vital to achieving improvements in Transjakarta's on-ground performance are unlikely to contribute towards intermediate states and impact, because they were either not achieved or not designed to feed into a continuing process. These are: (i) optimised ticketing system (A2.a); (ii) reduction in traffic delays at intersections (A.3); (iii) optimised BRT services (A.4); and (iv) effective travel demand management (B.7). The five remaining outcomes achieved a 'C' rating – measures to move towards intermediate states have started but without results so far.

59. The ratings of forward linkages and progress towards intermediate states give us a combined rating for the potential contribution of each project outcome to intermediate states and impact. Only six out of 11 outcomes are considered 'likely' or 'moderately likely' to contribute to intermediate states and impact, while five are ranging between 'moderately unlikely' and 'highly unlikely'. It is therefore concluded that it is overall moderately unlikely that the project has contributed to the attractiveness of the BRT as an alternative to driving and the public image of public transport and NMT. It is also unlikely to have influenced transport choices among urban travellers towards using more efficient public transport and NMT means. However, a minor global impact on GHG emissions, though much less than planned, was noted (refer paragraph 56).

**Evaluation rating:** Moderately Unlikely.

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<sup>65</sup> This is a surprising rating but may reflect the ability to travel to desired destinations despite irregular service.

**Table 5: Rating on Outcomes, Progress Towards Intermediate States & Likelihood of Impact**

Direct Outcomes	Outcome Rating		Progress Towards Intermediate States		Likelihood of Impact	Overall rating
	Rating	Justification	Rating	Justification		
A.1 BRT corridors 4-14 completed & functioning well*	B	Largely delivered and part of on-going program	C	Part of on-going program with deficiencies but lay basis for turnaround	BC+	Likely
A.2a Optimised ticketing system functioning	D	Partially delivered but not a basis for a sustainable transit ticketing system. Current lock-in to banks via 5 year contract makes change unlikely in short term	D	Rating not required although default is 'D' since outcome rating is C or D	DD	Highly Unlikely
A.2b Transjakarta is established as a fully functioning capable company	B	Partially delivered with local law passed one year after project close to establish BUMD indicating potential for transformation going forward	C	Potential for transformation exists but significant challenges and uncertainties are present	BC	Moderately Likely
A.3a Intersection conflicts reduced along BRT corridors	D	Enforcement delivered post project and new ITS centre offers some opportunity for reduction in delays but the track record for reduction of delays is poor with little prospect for improvement	D	Rating not required although default is 'D' since outcome rating is C or D	DD	Highly Unlikely
A.3b. Adequate CNG supply is conveniently available	B	Outcome delivered by other agencies but program of new CNG stations is not determined by Transjakarta	B	Scaling up and improvement over time is possible but dramatic improvement is not as long as buses must leave revenue-earning service to travel to CNG stations	BB	Moderately Unlikely
A.4 BRT services optimised	D	Outcome not achieved but creation of BUMD may offer potential for improvement although availability of convenient access to CNG stations and reduction in intersection delays are limiting factors	D	New BUMD offers potential. Challenges remain. Rating not required although default is 'D' since outcome rating is C or D	DD	Highly Unlikely

Direct Outcomes	Outcome Rating		Progress Towards Intermediate States		Likelihood of Impact	Overall rating
	Rating	Justification	Rating	Justification		
B.5 Information/awareness on BRT & other PT is enhanced	B	Outcome partially achieved. New BUMD offers potential for improvement	C	New BUMD offers potential. Challenges remain	BC	Moderately Likely
B.6 Feeder services to BRT operated in all corridors	B	Outcome partially achieved. New BUMD offers potential for improvement.	C	New BUMD offers potential. Challenges remain	BC	Moderately Likely
B.7 Travel demand management is implemented	C	Outcome partially achieved and basis is laid for future	D	Rating not required although default is 'D' since outcome rating is C or D	CD	Highly Unlikely
B.8 Pedestrian/NMT facilities improved in Jakarta/ other cities	B	Outcome achieved and there is an on-going program to continue - the achievement is however partial due to the considerable physical constraints	C	Despite constraints the program will continue with overall success dependent on improvements to other part of BRT system e.g. operations	BC	Moderately Likely
B.9 Outreach & dissemination result in commitment to implement BRT/ NMT in 1 city	B	Outcome achieved and city has an on-going program	B	Barriers successfully addressed but constraints will likely hinder major scale-up	BB	Likely

(\*) **Globally significant impact:** + on basis of quantified GHG reductions for the project as a whole though they are minor.

#### (iv) Achievement of project goal and planned objectives

60. The project was designed to enhance BRT's operation as a rapid transit system bringing substantial welfare benefits to public transport users, car and motorcycle occupants through faster travel times and reduced out of pocket costs. Through effecting favourable behavioural changes, and a virtuous circle of improvement as described in paragraph 42, the two project goals, the project objective and global environmental objective were aimed to be achieved. The RToC with its logical pathways shows that the achievement of the direct outcomes on a substantial and integrated basis, rather than a partial basis, is the only means of achieving the project goals and the global environmental objective (i.e. impact).

61. The assessment of likelihood of impact as 'Moderately Unlikely' is largely based on the prevailing constraints that would affect performance of the bus services provided even after Transjakarta is converted to a BUMD. Further, the BUMD will likely take several years before it can operate effectively making it challenging to turn around the current declining patronage trend as it attempts to improve cost recovery. The BUMD would need to act quickly given that in the near term project-derived results and impacts are likely to continue to decline per unit of investment even as the BRT system is expanded to the full 14 corridors by 2015. End of project patronage was 390,000 pax/day or 55% of the target. However, patronage in 2012 was 111.25 million per year down from 114.78 million in the previous year. Nevertheless, GHG reductions assessed on a per passenger basis are comparable to other BRT systems world-wide (refer Annex 9). Overall, the realism of fully achieving the project goal and objectives may be questioned but a more substantial achievement than has been realised to date could have been possible. Nevertheless, there is potential for improvement going forward.

**Evaluation rating:** Moderately Satisfactory.

#### D. Sustainability and Replication

##### (i) Socio-political sustainability

62. BRT is now entrenched in DKI Jakarta as routine business and plans are to extend the system to the full 14 corridors<sup>66</sup> and retrofit some 21 inadequate stations mainly along Corridor 2. Despite poor quality BRT operations, and declining patronage and passenger opinion, none of the Transjakarta or DisHub officers consulted during the TE mission (refer Annex 2) pressed the case for converting Transjakarta to a BUMD or expressed concern about the quality of bus operations. The current Governor elected in September 2012 recently announced that Transjakarta would commence to operate buses directly in 2014 due to persistent problems with bus maintenance and bus service quality. The 310 new midi-buses<sup>67</sup> that commenced being delivered in late 2013 are to be operated by Transjakarta although it has no experience as an operator or maintainer of buses. The risks of Transjakarta providing poor quality service and exhibiting characteristics of a monopoly government

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<sup>66</sup> Corridor 13 (Blok M – Pondok Kelapa) is planned to open in 2014 and be mainly on elevated structure and likely to cost several times more per km than the earlier corridors that were constructed at-grade (on the same level as public roads).

<sup>67</sup> Single decker buses that are somewhat longer than minibuses but shorter than regular buses.

operator in future appear high<sup>68</sup>. However, at the same time, the passing of the local law on converting Transjakarta to a BUMD (refer para. 63 below) that had been waiting to be passed by DKI Jakarta's parliament for some time is a very positive sign.

**Evaluation rating:** Likely.

## (ii) Financial resources

63. As shown by the expenditure on BRT infrastructure and purchase of new buses by DKI Jakarta, the quantity of financial resources do not appear to be a limiting factor that constrains the improvement of Transjakarta. Further, the Australian government has provided advisory services to Transjakarta since the close of the UNEP project (extending to April 2014) and this assistance too was predicated on the early establishment of a BUMD that is only set to occur in January 2014. Two areas of concern in relation to finance are: (i) inadequate cost recovery of bus operations that is related to the issue of fare indexation, a key assumption for achieving 'longer term outcome 1' (it is estimated to be approximately 65%<sup>69</sup> on a realistic cost basis and declining); and (ii) the lack of multi-year forward financial budgeting and procurement for infrastructure and buses.

64. Under ideal gross cost bus contracting arrangements, simplistically known as a 'per-km cost' method in Jakarta, payments sought by operators would be established by competitive tender and pay for buses, services and maintenance to the specifications desired by Transjakarta (e.g. frequency by time of day, reliability, and other quality attributes etc.) plus incentive payments for carrying passengers rather than just operating buses. That is, the payments made would ensure the bus operators recovered their costs, permitted a small profit, and provided good quality services on a financially sustainable basis. Instead, the operators that have won recent tenders have bid significantly lower than the benchmark payments expected to be paid by Transjakarta. It appears that bus operators seek to derive income by cost-minimisation indicating the current contract forms and method of procurement are in need of reform before significant improvements in Transjakarta's long term sustainability can be expected. Equally, a dramatic improvement in service quality is also needed since the TE's surveys in January 2014 found that: (i) over 80% of surveyed BRT users considered the fare to be 'very cheap' or 'cheap' but 58% were willing to pay this fare and not more; and (ii) 48% considered waiting times long or very long but 15% considered that travel speed was slow or very slow. However, overall 82% of users were satisfied, very satisfied or thought the service adequate (refer Annex 7).

65. Contributing to poor cost recovery is the decline in real value of fares that for adult passengers remain today at the same nominal value of Rp. 3,500 per system entry, as they did in 2004. Inflation totalling 85.7% occurred over 2004 to 2012<sup>70</sup>. In real terms, therefore the fare declined in value by 86% over the period. The need to develop a system of regular fare indexation removed from the political process was understood to be recognised early in the project's implementation although no

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<sup>68</sup> In the 1970s and 1980s, Perum PPD, the then government owned bus company was well known for its lack of market discipline and significant financial losses and its poor quality bus services, albeit at low fares as shown by Rimmer (1991).

<sup>69</sup> Advice by Transjakarta and their consultants MR Cagney Pty. Ltd. funded by the Indonesian Infrastructure Initiative supported by the Australian government.

<sup>70</sup> Refer [<http://www.inflation.eu/inflation-rates/indonesia/historic-inflation/cpi-inflation-indonesia.aspx>] accessed 27 December 2013.

formal milestone for achieving this was reported until after MTE. The new BUMD status offers hope for resolution.

66. Although bus operator contracts extend for seven years, all forward budgeting for infrastructure for bus purchase and infrastructure are done on an annual basis. Significant inefficiencies likely arise in regard to bus purchase that have varied from 36 buses in 2012, to 310 buses in 2013 with a further 234 buses to be purchased in 2014 all with only one year of maintenance included under the supply arrangements. Longer term, strategic purchasing would anticipate the number of buses needed over several years and invite competitive tenders with a view to efficient purchasing at a significantly lower purchase price per bus and on a whole-of-life basis since maintenance and spare part agreements could be locked in at the outset. The TE team was informed that multi-year budgeting and procurement is possible, but more cumbersome, and hence avoided by DKI Jakarta staff. The TE team note such difficulties were overcome with the multi-year bus operational contracts.

**Evaluation rating:** Likely

### **(iii) Institutional framework**

67. As part of project design, the role of the Steering Committee, its composition and the project structure was very clear. However, the project's Project Management Unit (PMU), despite its name did not have the authority to actively manage or implement. The PMU consisted of ITDP the executing agency, plus other DKI Jakarta staff who were acting in their normal roles. In this sense, the implementation model that exists today for BRT is good as it utilises local planning and procurement systems and builds local technical capacity.

68. Within the current legal structure that existed to December 2013, much could have been done to improve Transjakarta's operations and management.<sup>71</sup> But the creation of a BUMD<sup>72</sup>, that at the time of writing looks certain to occur in early 2014, is widely understood to be the only way to achieve a rapid and sustained improvement in Transjakarta's operations. For the BUMD to realise its promise, several matters need to be addressed. It would need the right functional and legal structure, sufficient autonomy recognising it needs to provide public transport services for the benefit of Jakarta's citizens, effective management, creation of technical capacity, plus a major injection of capital and recurrent funding until such time as BRT operations would become profitable.<sup>73</sup> DKI Jakarta agencies will need to cooperate with Transjakarta to provide road space, manage traffic and provide the other facilities that would support improved BRT operations. A formal and well-structured agreement between DKI Jakarta and BUMD Transjakarta will be required for the mutual services each will need to provide.

**Evaluation rating:** Moderately Likely.

### **(iv) Environmental sustainability**

69. As shown above (refer paras. 55-57), a reduction in GHG emissions was confirmed due to the attraction of private motorists and other bus users but the achievement, and the potential for

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<sup>71</sup> For example, recruit appropriate expertise, build and maintain competence and restructure bus contract structures and procurement methods that currently focus on lowest cost and not quality.

<sup>72</sup> As assumed at project design, and during year 1 of the project when it was found the company did not exist was the basis of significant project supplied advice.

<sup>73</sup> Advice received by Tom Elliot, Team Leader for MR Cagney on December 9, 2013.

improvement, has fallen short of expectations. Benefits were also anticipated from reduction in distances travelled by taxis and use of more GHG-efficient CNG buses. However, use of CNG in BRT buses did not reduce GHG emissions. The project's final calculation of GHG emissions per bus-km were estimated to be 15% higher than for the equivalent diesel bus types in BRT service based on actual fuel consumption records. It would have been anticipated that GHG emissions per bus-km should be 10-15% lower for CNG compared to diesel rather than 15% higher. Bus operators claimed that high CNG consumption was due to high congestion in mixed traffic sections or when approaching bus stations, peak period overloading and poor CNG quality. Information supplied by an expert on CNG buses and BRT<sup>74</sup> indicates that the operators claims may have a basis but are not sufficient to explain the 30% difference between actual and expected efficiency of CNG consumption. The expert considers that, to the extent that records of official CNG consumption by buses are correct, that a key problem may be that the CNG engines are incorrectly calibrated for the drive cycle<sup>75</sup>. The project team put a lot of effort into understanding the issue but doubts about Pertamina's CNG meters meant that the issue appears unresolved to today.

70. CNG use also eliminated particulate matter air pollution, a key indicator of potential health damage, compared to existing buses in Jakarta but by a lesser amount compared to Euro 3 or Euro 4 buses that could have been purchased instead of CNG buses. The annual reduction in particulate matter does not appear to have been estimated by the project. Based on the annual kilometres of BRT bus operation in 2012 of which 36 million bus-km of which 90% were 12 meter rigid buses avoided on average approximately 1,000 mg/km of fine particulate matter<sup>76</sup> or 36 tonnes of particulate matter in 2012. Accurate figures of annual particulate matter emissions in Jakarta are not available to the TE, however a reduction of 36 tonnes in particulate matter is unlikely to make any noticeable difference to the background levels of ambient particulate matter concentrations. Given that the particulate matter was eliminated at ground level at BRT stations, it would be expected that BRT passengers would have enjoyed a substantial amenity benefit and reduced incidence of respiratory illness compared to a significant use of diesel buses for BRT. Along with a reduction in particulate matter, black carbon emissions would also reduce which have very high impacts on short-lived global warming. The project design did not address the benefits of reduced black carbon. There are no negative environmental impacts identified.

71. Impacting on Transjakarta in the future, and its ability to deliver improved environmental outcomes, is the mass rapid transit (MRT) railway system phase 1 that commenced construction in 2013. Due to the construction needs of the subway portion of phase 1, a net reduction in two BRT stations in corridor 1 will occur. BRT operations may be impacted as well. At completion, Phases 1 and 2 of MRT will together duplicate the whole of BRT corridor 1. But MRT is a very capital-intensive

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<sup>74</sup> Personal communication with John Rogers of World Bank on February 3, 2014 who developed the Clean Development Mechanism approved GHG methodology for the Mexico City Metrobus (ACM0016) and was closely involved with Metrobus and its CNG operations from the outset.

<sup>75</sup> New CNG buses were purchased by DisHub and transferred to BRT operators. Buses come with one year of maintenance only. Engine calibration may also degrade if bus operators do not enter into longer term maintenance agreements with manufacturers.

<sup>76</sup> Refer Table ES.1 in World Bank (2009), "Developing Integrated Emissions Strategies for Existing Land-transport (DIESEL) for Bangkok, Thailand (Draft Final Report)."

investment at \$1.5 billion and likely more.<sup>77</sup> Accordingly, MRT needs to be complemented by well integrated bus systems including BRT with good access provided to MRT stations by walking, cycling and motorcycle taxi. BRT's corridor 1 would likely have a valuable role as the backbone of the wider rapid transit system combining MRT with BRT. BRT would serve a wide variety of passenger trips, including short trip lengths<sup>78</sup> with different origin and destination patterns that cannot be well served by MRT, and do so at probable lower fare, while at the same time complement MRT. However, the TE team were told that there were no firm plans showing how MRT and BRT would be integrated and operate when MRT opens. There still exists the possibility that the MRT company (a BUMD owned by DKI Jakarta) may require part of the BRT system to be closed based on the TE team's discussion with the DKI Jakarta's Regional Economic Assistant.

72. As shown in the assessment of likelihood of impact, parking measures that have recently started implementation may have a minor positive influence of improved environmental outcomes in the medium term. Road pricing offers potential to give a one-off boost to emission reductions but its implementation is uncertain. Scaling-up BRT through dramatic reforms, and new investment, giving rise to improved bus services, would likely have no significant negative impacts and along with increased patronage, global environmental benefits would be expected to rise.

**Evaluation rating:** Moderately Likely

#### **(v) Catalytic role and replication**

73. The project design clearly aimed to catalyse behavioural change by showing how BRT could play a strategic role in Jakarta's urban transportation system. The major stakeholder was DKI Jakarta who was also a project partner. Through its various agencies including Transjakarta it provided double the amount of finance envisaged at project design and had implemented 12 corridors by January 2013, one month after the close of the project. Nevertheless, as described above, while project components were being implemented they were by themselves not sufficient to achieve a properly functioning BRT system.

74. Seeking to mobilise public opinion and improve BRT's image (Goal B) was a key aspect of the design. The critical risk foreseen in the design was "political and public acceptance". Countering risk in the design relied on (i) training and workshops; (ii) parliamentary briefing; (iii) public relations; and (iv) using opinion surveys and focus groups as management information. But collectively these outputs had to attempt to counteract the considerable negative aspects of Transjakarta's poor bus operational performance.

75. While not aiming to create champions, the project design instead supported the Governor of Jakarta who initiated BRT and the Mayor of Pekanbaru who has shown commitment to BRT by building the city's first corridor. Replication in such cases depends on local champions that may be influenced by the project but are not created by it. By the end of the project, at total of 12 other cities, apart from Pekanbaru, had emulated Transjakarta in some way due to local initiative.

76. The project successfully attracted some parallel co-finance provided by the Japanese External Trade Organisation for road pricing and traffic studies. The Australian government provided following

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<sup>77</sup> Taking into account of optimism bias where risk is not adequately accounted for, and could add up to 40% to the expected cost of an urban rail project. Refer B. Flyvbjerg, (2004). "Procedures for Dealing with Optimism Bias in Transport Planning, Guidance Document. Published by the British Department for Transport". Page 7.

<sup>78</sup>The 2012 Project Implementation Report Performance Indicators states that average trip distances of BRT passengers on the BRT was 13.2km in 2012 up from 4.4km at the start of the project.

on technical support to Transjakarta starting December 2012<sup>79</sup> led by an Australian consortium that includes ITDP. There was no formal strategy articulated for mobilising this finance. Co-financing was limited to in-kind contributions such as hiring of venues for workshops from mainly local agencies as shown in Table 2.

77. The project fostered important strengthening of the legal basis of Transjakarta in year 1 of the project once it was realised that the organisation had a limited capacity and legal basis. Nevertheless, this legal strengthening made little significant difference to the quality of BRT operations but has likely enhanced the sustainability of BRT in its current sub-optimal form. Contributions to potential policy change are good with important parking policy changes under implementation and the legal basis for road pricing now within reach. There is no information available on the progress on new parking regulations in other cities. NMT measures have been adopted in other cities but the TE team has not been provided with a full description of their current status and extent.

**Evaluation rating:** Moderately Likely.

#### E. Efficiency<sup>80</sup>

78. As a recognised expert on BRT, ITDP had earlier experience with the Transjakarta BRT that facilitated a close working arrangement with the key stakeholders, with project implementation building upon pre-existing partnerships, data sources, complementarity with other programmes in Indonesia, and globally, for the benefit of project efficiency.

79. The project leveraged \$419 million in DKI Jakarta investment more than twice that originally planned. The project team was able to successfully respond to strategic and tactical needs during implementation and support Transjakarta and the DKI Jakarta officials in charge of implementation. Within the original budget they provided support services over an additional year in response to DKI Jakarta's slow, but understandable, desire to address systemic problems from October 2007 when the then new Governor was elected. This continued support on a budget-neutral basis was provided by ITDP despite the use of 10% of the project funds for legal and regulatory advice that was unforeseen at project design. There were, however, additional supervision costs for UNEP due to the one year project extension.

**Evaluation rating:** Satisfactory.

#### F. Factors Affecting Performance

##### (i) Preparation and readiness

80. The project was prepared by ITDP utilising resources provided under earlier grant PDF-B. Due to ITDP's previous experience in Jakarta and Indonesia and with BRT in general, the project identified appropriate stakeholders, relevant project components and sound execution arrangement. The two local NGOs were chosen because of their prominence in Indonesia and knowledge of transport. However, the incorrect assumption on Transjakarta's legal status and capacity inherent in project

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<sup>79</sup> Scheduled to be completed by April 2014.

<sup>80</sup> Another dimension of efficiency, 'economic efficiency' is discussed in Annex 11. Economic evaluation is routinely used by IFIs such as the World Bank and ADB to assess the efficiency of investments in absolute terms and in relative terms, for example, to determined priorities for intervention. Such a tool seems to be overlooked here. Economic evaluation would for example play a valuable role in determining whether proceeding with Corridor 13 with proposed elevated structures and likely significant cost, would be a better investment that retrofitting existing corridors or addressing fundamental operational issues.

design, meant that in practice fundamental risks were not identified and project preparation was inadequate. Counterpart financial resources were not a limiting constraint. The project document was clear but founded on an incorrect assumption. The project document makes no reference to GEF policies on environment and social safeguards<sup>81</sup>, gender or indigenous peoples. Given the advisory nature of the project, environment and social safeguards would not have been invoked.

**Evaluation rating:** Moderately Unsatisfactory

### **(ii) Project implementation and management**

81. The quality of project implementation and its responsiveness to emerging needs was good and was aided by support of the UNEP Task Manager. To address inherited problems from the rushed implementation of corridors 1-3, plus to support development of the project corridors, timely advice on key issues was provided by ITDP to DKI Jakarta's implementation agencies. ITDP also provided advice on designs for stations and NMT treatments.

82. The project planned its activities on an annual basis synchronised to the preparation of the annual work programs of DKI Jakarta's agencies that by all accounts implemented them as planned. Though highly relevant and of high quality, these advisory services could not control the timing of extent of achievement of outcomes which depended on the motivations of DKI Jakarta's management. The emphasis of the agencies was more on infrastructure than on-going operations reflecting their agency responsibilities.

83. The MTE concluded that most technical problems identified by them and the actions needed to overcome them, had already been highlighted in advice provided by ITDP and others. BRTs around the world had similar technical problems, and ITDP had consistently supplied professional advice to the relevant DKI Jakarta agencies. The formal structure of the Steering Committee tied to the annual supervision schedule of the UNEP Task Manager was very valuable for elevating key project issues to a high level but use of less formal channels throughout the year was just as important.

84. The influence of ITDP, the executing agency, is seen by their absence since the project closed when as described in paragraph 61 the BRT system elements are now in decline. In the absence of ITDP, passenger information consisting of signage and maps that varies in appearance and information content has reduced the legibility of Transjakarta. The MTE made recommendations to create far more detailed milestones for measurement of achievement of project activities (refer paragraph 97) and these recommendations were followed from mid 2010. Annual Project Implementation reports and Six Monthly Progress reports do not refer to environment and social safeguards.

**Evaluation rating:** Satisfactory.

### **(iii) Stakeholder participation and public awareness**

85. The stakeholders for the project consisted of: (i) BRT users, other bus and private vehicle users; (ii) the citizens of Jakarta and neighbouring provinces, and of other cities in Indonesia; (iii) the DKI Jakarta government and neighbouring provincial governments and other city governments; (iv) and (v) national government agencies, mainly the Ministry of Transportation that is responsible for urban transport policy for the nation, Bappenas the national economic planning agency, the Police, Pertamina and the Ministry of Energy and Resources. Stakeholders also included road side users such

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<sup>81</sup>Refer [<http://www.thegef.org/gef/content/application-policy-environmental-and-social-safeguard-standards>] for 2013 standards.

as vendors, pedestrians, shop keepers and traffic police. Most of these stakeholders would be expected to have benefited from the project. Motorists who did not have significant road space taken from them to create the BRT's exclusive running lanes also benefited. The media were also another key stakeholder since they had the ability to disseminate information and influence public opinion.

86. However, the RToC shows there were four main stakeholder groups that determined the success of the project: (i) DKI Jakarta Government, its agencies including Transjakarta; (ii) BRT users and potential users mainly other bus and private vehicle users; (iii) BRT bus operators; and (iv) national agencies mainly the traffic police, Ministry of Energy and Resources and Pertamina. Formal membership of the Steering Committee included representatives of key stakeholder groups (i) and (ii). Although representatives from groups (i) and (ii) did not always attend Steering Committee meetings, project reporting indicates regular information dissemination among, and consultation between, them when important challenges arose. BRT users were represented on the Steering Committee by the Chairperson of the Jakarta Transportation Council established by the Governor to advise on consumer rights. The Steering Committee, officially chaired by the Governor, also therefore represented the interests of all Jakarta citizens through the democratic process. It is unlikely that Ministry of Energy and Resources or Pertamina, had they been part of the Steering Committee would have acted more quickly to assist to resolve the CNG pricing, adequacy and quality of supply, and distribution by new CNG stations, since their responsibilities are national in scope.

87. BRT operators were not represented on the Steering Committee, but this omission is unlikely to have affected the quality of bus operations since bus operator incentives and operating responsibilities are determined by the contract structure that has been assessed as deficient (see paragraph 64). External influences such as distances to CNG stations<sup>82</sup> and traffic conditions that are outside the control of operators were also important. Within the DKI Jakarta government cooperation between agencies was strong under the initiating governor and remained so until the end of the project.

88. Ultimately decisions on BRT, broader urban transport policy, road pricing and energy policy were retained by the responsible agencies that is, DKI Jakarta and national agencies, with likely little participation of other agencies. While public transport users were the main target group of the project design in practice they had little influence on the quality of facilities and services.

89. The project design allowed for a variety of awareness and training programs of media, city officials and NGOs both in Jakarta and in Pekanbaru. The awareness and training programs were well planned and responded to important implementation needs. It is not possible to gauge the effectiveness of this awareness raising. The TE's assessment of sentiments provided by media (refer Annex 10) showed that the most favourable coverage was in 2008 and 2011 when new BRT corridors had been recently opened. Media coverage is considered to have been balanced covering good and bad performance of the BRT as shown in Annex 10.

**Evaluation rating:** Satisfactory

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<sup>82</sup> In Indonesia, the normal practice for bus operators is to not have their own dedicated fuelling facilities likely reflecting under-capitalisation and the practice of bus crews renting buses by the day. Although the latter practice does not apply to Transjakarta, BRT buses must leave revenue earning service to refuel, whether it is for diesel fuel or CNG. This is unusual when viewed against good practice for bus operations.

#### **(iv) Country ownership and driven-ness**

90. The governor of DKI-Jakarta who initiated Transjakarta championed BRT with one of the aims being to create a structural change in the way urban public transport services were regulated and provided. Similarly, the mayors of other cities such as Yogyakarta, Pekanbaru, Surakarta and 10 other regional cities have seen the advantages of promoting BRT. The current Governor of Jakarta was until 2012 the Mayor of Surakarta and had introduced a form of BRT into the city.

91. The national government's policy on decentralisation that started to be implemented in the 1990 has led to cities having strong democratically elected mayors and growing local revenues. These changes have led to cities developing initiatives such as BRT as means to quickly provide benefits to their citizens.

92. DKI Jakarta has shown that BRT, after eight years of implementation (2004-2012) is 'business as usual'. With successive changes of Governor there has been, until the recent decision to convert Transjakarta to a BUMD, less visible enthusiasm for transforming Transjakarta to be a world-competitive BRT carrying close to double or more passengers at a much higher quality of service and profitability. The business plan being prepared by the current Australian government assistance to Transjakarta, as did that of ITDP, aims to support such a transformation.

**Evaluation rating:** Moderately Satisfactory

#### **(v) Financial planning and management**

93. ITDP's financial management system (for their project activities) demonstrated sufficient integrity that the annual audits found no irregularity and that project activities were able to be tracked in detail by ITDP's management and UNEP. UNEP have not indicated that there is any residual problem with financial reporting even though the project was completed at the end of 2012. As shown in Annex 4, actual variances in expenditure by type of input were very minor. Flow of funds was straightforward with arrangements made between ITDP staff, consultants and providers and in turn with ITDP and UNEP. Due to tight financial management the project was able to be extended by one year for no increase in budget.

94. Due to the advisory nature of the project, recruitment of staff, procurement of consultants was apparently done promptly and in accordance with UNEP guidelines. There is no evidence to the contrary. Leveraged co-financing resources were significant. DKI Jakarta's funding was more than double that anticipated at project design, yet the cost effectiveness of these funds has fallen short of expectations.

**Evaluation rating:** Satisfactory

#### **(vi) UNEP Supervision and backstopping**

95. Formal oversight arrangements were very clear through the creation of the Steering Committee. Formal supervision missions of up to two weeks were carried out by the UNEP Task Manager annually and timed to coincide with the meetings of the Steering Committee with associated side meetings. The annual Project Implementation Reviews (PIR) that reported against outputs, outcomes and key performance indicators was a key input to Steering Committee meetings.

96. Formal progress reporting was also provided by the six monthly progress reports that reported against milestones. At the request of the UNEP Task Manager, ITDP provided shorter almost monthly progress reports highlighting key issues. These were supplemented by up to five mission reports each year by ITDP's project director who was not based in Jakarta but was present in the field for up to two months annually. From project records, there is evidence of very extensive communication between the Task Manager, the ITDP project director and ITDP staff by email and phone calls on key issues both technical and administrative that the Task Manager could assist to resolve.

97. The Task Manager's ratings of progress towards achievements in the December 2012 annual project implementation report for the nine original objectives closely matches the ratings provided by this TE except for outcomes for 'Objective 6: Rationalise Non-BRT Bus Routes' that this TE considers were only partially achieved according to the desired concept of direct feeders under Transjakarta's oversight. The Task Manager rated implementation progress as 'moderately satisfactory.' However, the project design document considered the objective was 'to maintain other bus services in BRT corridors', to complemented BRT, rather than withdraw them. This is a valid objective. The reporting of outcomes on sources of patronage from these 'feeder services' is provided in the project implementation report. At close of the project 57% of BRT passengers are estimated to have accessed BRT by other buses and that is higher than the target figure of 50%. Hence, this would explain the Task Manager's rating. Internal project management risks were rated low or medium by the Task Manager and these ratings are considered realistic by the TE.

**Evaluation rating:** Satisfactory.

### (vii) Monitoring and evaluation

98. **Monitoring and Evaluation Plan Design.** The outputs, indicators, means of verification and baseline measurements were specific, measurable, assignable, realistic and had a clear time frame. Targets were set for end of project achievement of outcome indicators but intermediate targets were not – they were added during project implementation. The text of the project document described how the project could achieve its objectives, the two goals and the global environmental objective, but this was not fully articulated in the design of the original logical framework. The performance indicators were reported annually in the PIRs. One indicator in the logical framework was practically impossible to measure namely the estimates of contributions to greenhouse gas reduction by corridors, ticketing, and bus feeders etc., that were intended to be separately quantified. This was never done due to the technical difficulties chief amongst which is that greenhouse gas reductions are largely a joint effect of all of these factors.

99. Targets were set at project design for 16 milestones to aid the monitoring of implementation progress for end of year reporting. Following the MTE, two new objectives were retrofitted into the project M&E system: (i) to establish Transjakarta as a fully functioning BUMD; and (ii) to ensure the adequacy of CNG supply. Milestones were completely overhauled with 54 milestones being adopted with precise target dates.

**Evaluation rating:** Moderately Unsatisfactory.

100. **Budgeting and funding.** There is no evidence that resources were insufficient to complete monitoring and evaluation activities or there was any difficulty amongst partners in contributing to the monitoring and evaluation processes. Substantial budgets totalling in excess of \$100,000 per annum for M&E were provided under each of the original nine objectives.

**Evaluation rating:** Satisfactory.

101. **Monitoring and Evaluation Plan Implementation.** The monitoring and evaluation system was implemented from the first six monthly progress report and annual Progress Implementation Report. The first PIR showed intermediate targets for key performance indicators that were not present in the original logical framework. Until MTE, the 16 milestones provided some utility for measuring progress in the six monthly progress reports but the narrative text that was more detailed was very helpful. The 54 more detailed milestones adopted at MTE in July 2010 provided valuable information for close monitoring of progress. The six monthly progress reports and annual project implementation reports were detailed and produced in a timely manner. The Task Manager actively used the M&E reports to monitor project implementation and to intervene when needed. Ratings of

the executing agency ITDP and the UNEP Task Manager on progress with achievement of outcomes are considered to be realistic based on the information available at the time.

**Evaluation rating:** Satisfactory.

### G. Complementarity with UNEP Strategies and Programs

102. Through reducing GHG emissions and the design establishing a platform for wider scale reduction in GHG emissions in Jakarta for urban transport and 13 other regional cities the project made a modest contribution, with a theoretical potential for a more significant achievement, to UNEPs Expected Accomplishments and programmatic objectives set out in the POW 2010-2011, the proposed Biennial Program and support budgets for 2010-2011 and the Medium Term Strategy for 2010-2013. In particular the project is consistent with sub-programme 1 designed to facilitate transition in low income countries to low carbon societies and on sub-programme 4 designed to enhance environmental governance by catalysing international efforts to pursue agreed international objectives and to promote an environmental basis for sustainable development. Similarly, it contributed to the 2010-2013 Medium Term Strategy's expected accomplishments for 'Climate Change' and 'Environmental Governance.' The project was therefore consistent with theme 2 (facilitate transition to low carbon societies) and 4 (communicating and raising public awareness) of UNEP's Climate Change Strategy 2010-2011. However, the extent of the project's theoretical contribution appears in doubt based on the assessment of effectiveness derived from the RToc.

103. The project was aligned with UNEP's Bali Strategic Plan for Technology Support and Capacity-Building (2004) in thematic areas of relevance – climate change and pollution – and is consistent with the basic approach of the plan: (a) efforts should build on existing capacities; (b) activities under the plan must have national ownership to ensure that built capacities are sustained; and (c) capacity-building programmes must be tailored to individual countries based on a bottom-up needs-assessment.

104. While the project benefits women who are 50% of all BRT users, gender was not a specific feature of project design. During project implementation some gender-specific policies were adopted by Transjakarta but these initiatives though welcome fell short of a systematic effort to increase female participation in Transjakarta's management. The initiatives were: (i) a target of 30% of bus drivers to be female; and (ii) minimising harassment of females on buses by: (a) adopting segregated bus compartments (December 2011); and (b) trialling Closed Circuit Television at a crowded BRT station in 2011.

105. South-South cooperation was a feature of the project. Transjakarta's BRT design was modelled on that of the TransMilenio BRT in Bogota, Columbia. The project arranged for South American experts to advise on improvements to Transjakarta during implementation. Officials from Transjakarta visited Bogota for training. The project shared information with other UNEP initiatives such as the Clean Fuels Initiative globally and BRT projects in Eastern Africa.

## V. Conclusions and Recommendations

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### A. Conclusions

106. The project commenced implementation three years after Transjakarta was first launched as an initiative of the then Governor of DKI Jakarta during which time four BRT corridors of generally poor quality were implemented. The Executing Agency, ITDP, provided limited support to the transportation agency, DisHub and Transjakarta, during this period with funding by USAID and the earlier UNEP/GEF grant PDF-B. With the aid of PDF-B, the project was designed in 2006 by ITDP in collaboration with UNEP/ GEF.

107. The project design was strategically-relevant and technically comprehensive but overestimated the status and capacity of Transjakarta and therefore underestimated the risks to project implementation (refer paragraphs 32-34). These risks were increased by the change of Governor during year 1 of the project implementation.

108. Further, the project design necessarily provided ITDP, with a supporting advisory role to DisHub, Transjakarta and other DKI Jakarta agencies. That is, ITDP did not control any aspect of implementation since this task was in the hands of the existing agencies of DKI-Jakarta. While this approach is desirable for capacity building, the project's desired outcomes could not be guaranteed. The project's institutional structure was thoughtful and very useful but was insufficient to overcome the day to day problems with implementation by multiple agencies.

109. Although the project team quickly identified the problems related to an inadequate legal basis for, and dearth of technical capacity in, Transjakarta, the achievement of the project's ambitious targets were significantly hindered from the outset. The project's targets for corridor expansion were largely achieved through an investment of \$419 million although not to an adequate quality as shown by ITDP's ratings. But poor attention by implementation agencies to improving the quality of bus services, reducing operational delays, improving ticketing and fares, and optimising bus feeders reduced the ease of using the BRT system (refer paragraph 77 and Annex 6). The quality of passenger information has deteriorated reducing the legibility of Transjakarta.

110. Further, CNG supply constraints unforeseen during project design were a fundamental problem for BRT operations and still impact on its efficiency today (refer Annex 6) It appears that despite annual perception surveys of BRT users and non users by Transjakarta improving the quality of bus services delivered to bus passengers had a lower priority than building BRT infrastructure.

111. As shown in Table 6, and as presented in detail in Annex 6, where the achievement of outputs and outcomes are described (as revised by the RTOC) many opportunities to improve bus services for the benefits of passengers were neglected by bus operators and Transjakarta who was responsible for managing them. As a result of the efforts of ITDP and UNEP's Task Manager to highlight these problems some improvements were made to improving station capacity constraints and bus operations but not to the extent that it made a significant difference on the ground for the BRT system as a whole.

112. As a result, the project's achieved patronage increase from 2006 to 2012 was less than half of the planned increase of 600,000 pax/day<sup>83</sup> (compared to the actual 105,000 pax/day at end 2006). By the end of the project, BRT patronage was declining despite and expansion of the BRT system

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<sup>83</sup> In fact, targeted for the original project close of end 2011.

(refer Annex 1). Public attitudes to BRT were poor at the end of the project as shown (refer paragraphs 56-57).

113. A greater focus on meeting travel needs of existing and potential bus users would have likely resulted in increased estimates of GHG reduction but more importantly resulted in improved welfare outcomes for Jakarta's travellers through reduced travel times and improved trip time reliability (refer paragraph 52). Such improvements in travel time and quality are more likely to lead to beneficial and complementary land use initiatives such as Transit Oriented Development.

114. The project team's early focus during implementation on supporting the strengthening of the legal basis for Transjakarta with fairly rapid implementation of the full BLU by 2010, given enabling national regulations were only developed in 2007, were arguably a success. However, as shown in Annex 6, the full potential of the BLU structure for Transjakarta was not exploited with outside management expertise shunned and little effort by DisHub and its political masters to require Transjakarta to improve bus operations. Although Transjakarta's capacity was weak, a fundamental requirement for its improvement is, an order from the top with the associated act of holding senior managers in DisHub and Transjakarta accountable. The failure to realise the potential of the BLU structure is a reason to be cautious in expecting a rapid turnaround in BRT performance through the conversion of Transjakarta to a BUMD as approved by DKI Jakarta's parliament on 30 December 2013.

115. New challenges remain to be faced by Transjakarta with the expected disruption to Corridor 1, the main corridor of the BRT system and representing some 25% of its patronage, during Stage 1 of MRT construction. Further, there remains the possibility that when MRT Stage 1 is completed around 2018, that corridor 1 may be partially or fully closed. There appears to be no alternative rapid transit integration plan showing how MRT Stage 1 and subsequent MRT lines would integrate with remaining BRT corridors for mutual benefit and the benefit of Jakarta's citizens.

116. The achievement of the direct outcomes of the project were rated as 'Moderately Satisfactory' (refer paragraph 51) taking into account the challenging environment during implementation and the likelihood that further progress on some direct outcomes will be made in the near future. Given the recent decision to create the BUMD there is reason to be cautiously optimistic that it could transform Transjakarta's operations and ensure a harmonious co-existence with the MRT in future. However, there are prevailing constraints that are largely outside of Transjakarta's control. It is unlikely that it can quickly become effective and increase patronage as it must also increase real fares to improve cost recovery. Hence, this means the assessment of likelihood of impact using RoTI based on the reconstructed TOC is 'Moderately Unlikely'. On balance, the assessment of achievement of planned project goal and objectives is 'Moderately Satisfactory.'

117. Sustainability is a key criterion and is assessed as 'Moderately Likely.' However, this assessment is based largely on a view that Transjakarta will continue to exist but continue to perform at below its potential and is unlikely to achieve a much hoped for transformation in the next few years. Taking into account all factors, the overall evaluation rating is that the project's performance was 'Moderately Satisfactory' (refer paras. 53-61). A summary of the individual ratings for each criterion is shown in Table 6.

**Other questions** that the ToR suggested be examined concern:

118. **How and to what extent did the project have an impact on the modal split of road users in DKI Jakarta and impact on TOD?** As shown in paragraph 52, the project is estimated to have contributed an additional 60,000 daily trips or 1.3% of the growth from 2002 to 2010 but only represent 0.24% of total daily public transport trips. A single BRT system operating below potential is unlikely to significantly change public transport's modal share. Transit oriented development potential was enhanced by the project. However, it is recognised that these positive initiatives were

not created by the BRT but instead particular urban developments took advantage of the proximity of the BRT to increase their attractiveness in the market.

**119. What is the global and local environmental impact of the BRT project and NMT components?**

The project's estimated GHG emissions reduction in 2012 was 0.18 tonnes (reduced annually) per daily BRT passenger. These estimates of annual GHG reduction per daily BRT passenger were consistent with the experience from the two approved CDM BRT projects (refer paragraph 55 and Annex 9). Estimates of GHG reduction due to increases in cycling and walking due to relevant project activities were not made by the project. CNG use also eliminated particulate matter air pollution, a key indicator of potential health damage, compared to existing buses in Jakarta. Given that the particulate matter was eliminated at ground level at BRT stations there would have been a substantial noticeable effect by passengers of improved amenity and likely reduced incidence of respiratory illness compared to a significant use of diesel buses for BRT. There were no negative environmental impacts identified. Refer paragraph 70.

**120. What was the impact of use of CNG on GHG emissions?** The project's calculations of GHG emissions per bus-km are estimated to be 15% higher than for the equivalent diesel bus types in BRT service based on actual fuel consumption records. It was anticipated that GHG emissions per bus-km would be 10-15% lower for CNG compared to diesel rather than 15% higher. Information supplied by an expert on CNG buses and BRT<sup>84</sup> suggests, to the extent that records of official CNG consumption by buses are correct, that a key problem may be that the CNG engines are incorrectly calibrated for the drive cycle. The issue appears to be unresolved to today. Refer paragraph 69.

**121. Has the Transjakarta project (both BRT and NMT) made any contribution to similar developments in other cities in Indonesia (and beyond)?** Transjakarta itself had a major influence on transport policy in 13 other regional cities but no quantitative data on outcomes was provided to the TE. Refer paragraph 75.

**122. What was the projects' impact in the Non Motorised Transportation (NMT) sector?** Non motorised transport has been assisted in a minor way by NMT improvements promoted by the project but data are scarce. Refer paragraph 52.

**123. To what extent has the project influenced the policy of the incoming city government administration in the area of TDM?** As shown in paragraph 50, new parking regulations to cap the maximum number of car parking spaces in developments were implemented post project but would not have had any significant effect to date. The regulation to encourage space turnover and modernise the method of fee collection had not been implemented at time of the TE. However, overall changes in parking regulations even when they take effect, are unlikely to moderate demand, instead they would be expected to redistribute it. Local regulations have not been passed to implement road pricing but no serious policy on road pricing is apparent<sup>85</sup>. Refer paragraph 52.

**124. How does for a city such as Jakarta BRT compare overall in terms of project cost, project preparation (effort and time) as well as environmental impact?** Compared to rail MRT systems,

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<sup>84</sup> Personal communication with John Rogers of World Bank on February 3, 2014 who developed the CHG methodology for the Mexico City Metrobus and was closely involved with Metrobus and its CNG operations from the outset.

<sup>85</sup> A major Electronic Road Pricing trial was announced in May 2014 to be started in July 2014.

such as the 15.7 km first phase Jakarta MRT <sup>86</sup> at a cost of \$1.5 billion or more that may carry demand in its opening year of less than 200,000 pax./day, the 180 km Jakarta BRT system that cost between \$800 million to \$1 billion carried 390,000 pax./day at the end of 2012 (project closing date). This is quite efficient. Compared to other modern BRT systems, Transjakarta performs less favourably. Refer paragraph 52.

**Table 6: Summary of Evaluation Ratings**

Criterion	Summary Assessment	Rating
<b>A. Strategic relevance</b>	Consistent with Indonesian priorities on climate change, took advantage of UNEP comparative advantages, consistent with GEF goals, and UNEPs Bali Strategic Plan (refer paras. 45-49)	Satisfactory
<b>B. Achievement of outputs</b>	Project outputs mainly consisting of professional services largely completed as described in para. 50.	Satisfactory
<b>C. Effectiveness: Attainment of project objectives and results</b>	The recent decision by DKI Jakarta to convert Transjakarta to a BUMD offers significant potential for a transformation of the BRT. The project can take considerable credit. There remain substantial challenges ahead. However, in recognition of the challenging circumstances faced during project implementation a rating of MS was assessed.	Moderately Satisfactory
1. Achievement of direct outcomes	Ratings out of 6: 3 rated 'S,' 3 rated 'MS,' 2 rated 'MU,' and 3 rated 'U' following UNEP guidance. Refer para, 5, Table 3 and Annex 6 for a detailed discussion.	Moderately Satisfactory
2. Likelihood of impact	The creation of the BUMD offers potential for transformation of BRT services but prevailing constraints are limiting factors. Refer paras. 53-57 & Table 4.	Moderately Unlikely
3. Achievement of project goal and planned objectives	Annual GHG reductions per pax. are comparable to other BRT systems. However, patronage is just over half of end of project target and declining. It is unlikely the new BUMD can turn these trends around in the medium term. Refer paras. 60 & 61.	Moderately Satisfactory
<b>D. Sustainability and replication</b>	Lowest rating below applies using UNEP guidance	Moderately Likely

<sup>86</sup> That commenced construction in October 2103. Phase 1 from, from Lebak Bulus in Southern Jakarta to the Hotel Indonesia traffic circle in Central Jakarta overlaps Corridor 1 of Transjakarta.

Criterion	Summary Assessment	Rating
1. Socio-political	Transjakarta's future in a positive form appears assured. Its existence for 9 years and now formal recognition by DKI parliament indicates socio-political sustainability. Refer para. 62.	Likely
2. Financial	Funding has not been a constraint. Cost recovery should improve and fare are likely to be indexed following creation of the BUMD. Refer paras. 63-66.	Likely
3. Institutional framework	Use of DKI's agencies for implementation during the project was desirable for capacity building. Creation of BUMD Transjakarta can significantly revitalise BRT if Transjakarta has the relevant support from DKI agencies. Future role of BRT, bus and MRT is unclear. Refer paras. 67 & 68.	Moderately Likely
4. Environmental	Modest GHG and air pollution benefits are attributable to the project with no significant negative environmental effects. Refer paras. 69-72.	Moderately Likely
5. Catalytic role and replication	Project supported existing champions – Governor of DKI at project outset and mayors of regional cities. Attracted some co-financing and laid basis for parking policy changes, revised attitudes on NMT and potential for road pricing. Refer paras. 73-77.	Moderately Likely
<b>E. Efficiency</b>	Project's resources leveraged DKI's many times larger investment. Refer paras. 78 & 79.	Satisfactory
<b>F. Factors affecting project performance</b>		Satisfactory
1. Preparation and readiness	Project was well prepared in many respects except the design failed to realise Transjakarta's actual legal status at the time. Refer para. 80.	Moderately Unsatisfactory
2. Project implementation and management	Project implementation was good and responsive to changing needs. Refer paras. 81-84.	Satisfactory
3. Stakeholders participation and public awareness	Key stakeholders were identified and participated in the project. Public awareness of BRT and related transport issues were supported by the project. Refer	Satisfactory

Criterion	Summary Assessment	Rating
	paras. 85-89	
4. Country ownership and driven-ness	By supporting the initiating Governor's BRT plans, the project supported the nation's decentralisation agenda. Refer paras. 90-92.	Moderately Satisfactory
5. Financial planning and management	ITDP's financial management and procurement was appropriate and timely and independent auditing confirmed this. Refer paras. 93-94.	Satisfactory
6. UNEP supervision and backstopping	With annual supervision missions and extensive communications in response to regular project reporting on a monthly, 6 monthly and annual basis, supervision was highly responsive and strategic. Refer paras. 95-97.	Satisfactory
7. Monitoring and evaluation		Satisfactory
a. M& Design	M&E design flawed by flawed project design. Refer paras. 98-99.	Moderately Unsatisfactory
b. Budgeting and funding for M&E activities	Adequate funding provided. Refer para. 100.	Satisfactory
c. M&E Plan Implementation	M&E implementation was timely and detailed and significantly upgraded following MTE recommendations. Refer para. 101.	Satisfactory
8. Complementarity with UNEP strategies and programs	High complementarity with strategies and program of work. Refer paras. 102-105.	No rating required
<b>Overall project rating</b>	Despite satisfactory implementation, the inherent project design deficiency led to an overly ambitious project targets that fell far short of being achieved. However, it was recognised that these achievements occurred in spite of the challenging implementation environment. Prospects in future are expected to be better with the creation of the BUMD. However, significant challenges remain.	Moderately Satisfactory

## B. Lessons Learned

125. Based on the analysis and conclusions above, and having regard to the specific guiding questions listed in the ToR for the TE, the key lessons are set out below.

126. **An important and overarching lesson is that project design must be realistic and appropriate for the institutional environment and the technical capacity of prevailing agencies.** Instead the focus of the project design was on technical aspects which is important, but alone, is insufficient. The failure to understand the actual institutional constraints during project design led to an underestimation of risk and hence the setting of overly ambitious targets. Had the institutional situation been correctly diagnosed during project design, corrective measures with appropriate resources could have been put in place at the outset of the project instead of one year later. Given that this TE concludes that the project did have some, though limited, success in institutional strengthening, after a re-orientation of support during year 1, the delay in providing the appropriate support would likely have reduced the project's potential achievements. Although Transjakarta itself is a major innovation, representing a break with the normal means of bus service provision in Indonesian cities with all its attendant problems, the project cannot claim credit for the initiative. The project is necessarily evaluated against the ambitious targets that were set at the outset and in this respect did not fare as well as it should have.

127. **Creation of appropriate institutions is no guarantee that they will automatically perform as anticipated** without strong political direction, provision of adequate resources, appropriate incentive mechanisms for executives and staff, enhanced technical capacity and agreements with other agencies from whom other services and inputs are required. The conversion of Transjakarta to a BLU in 2010 did not lead to sustained improvements in passenger service due to a lack of leadership and the building of technical capacity for improving BRT service performance and associated reduction in traffic delays.

128. **Improved project performance would likely result from a greater focus on current and potential BRT passengers (or customers).** A strong focus on improving BRT services for the benefit of passengers by DisHub and Transjakarta would likely have led to greater achievement of outputs and direct outcomes. To engender a strong customer orientation in a service organisation is complicated but a key driver would be the creation of an appropriate incentive structures for agencies, and individuals in terms of financial remuneration, and career opportunity. Analysis of existing incentive structures, and how they can best be modified, should be a component of future support to BRT agencies in future.

## C. Recommendations

129. Three recommendations were identified to assist UNEP/GEF with similar projects, and also Transjakarta, in future:

- **Project design should include a thorough diagnosis of institutional and capacity constraints as well as prepare technical aspects.** Such a diagnosis would ensure that project risks were properly identified along with corrective measures, the chosen project activities (outputs) are appropriate with the correct allocation of resources, and the project's proposed direct outcomes (and targets) are realistic. The UNEP Quality Assurance Section should verify that future project designs include an institutional analysis with an appropriate level of depth.
- **UNEP should consider making use of economic evaluation for measuring overall 'efficiency' of the transport projects –and arguably all climate change mitigation projects- it supports.** Economic evaluation brings together in one place the relevant project information on costs, demand and benefits including travel time, air pollution and GHG reductions (and their incidence among societal groups). Good evaluations can tell a useful story describing how and

why benefits arise and how they can be maximised. Economic evaluation is the normal means of evaluating the efficiency of project investments used by International Financial Institutions (IFIs) such as the World Bank and Asian Development Bank and should be considered for use in future projects. The UNEP Quality Assurance Section should actively promote the use of economic evaluation in future project design.

- **UNEP should encourage other development partners to provide further support to the new Transjakarta BUMD to realise a much needed transformation.** Despite the TE's assessment the new Transjakarta BUMD deserves support to assume a more effective role in future. External assistance for at least a further two years would appear warranted after which the potential or otherwise of the new BUMD should be apparent. UNEP should advocate with other development partners to fund further support to the TransJakarta BUMD.

## Annex 1: Chronology of Transjakarta Corridor Implementation

Table A1.1: Chronology of BRT Corridor Implementation

Year	Corridor (date)	Length km (1)	Date	Patronage		Governor of DKI Jakarta
				Daily Pax (2)	Annual Pax (millions) from Transjakarta at end of year (3)	
2004	1 Kota – Blok M	13.6	January 2004	52,400 (December)	15.94	Lt-General Sutiyoso, 1997 to October 2007
2005		0		68,400 (December)	20.798	
2006	2 Harmoni – Pulogudang	13.3	January 2006	104,600 (December)	31.8183	
	3 Ps Baru – Kalideres	15.4	January 2006			
	<b>Sub-total</b>	<b>42.3 (reported as 44km in PIRs)</b>				
2007	4 Pulogadung – Dukuh Atas	11.9	January 2007	114,000 (June)	61.446	
	5 Ancol – Kp. Melayu	11.9	January 2007			
	6 Dukuh Atas – Ragunan	14.0	January 2007			
	7 Kp. Melayu – Kp. Rambutan	13.4	January 2007			
2008		0		214,600 (June)	74.62	Dr. Ing. H. Fauzi Bowo, October 2007 to October 2012
2009	8 Harmoni – Lebak Bulus	26.0	February 2009	254,000 (June)	82.372	
2010	9 Pluit – Pinang Ranti	28.8	December 2010	255,000 (June)	86.93	
	10 PGC Cililitan – Tanjung Priok	19.4	December 2010			
2011	11 Kp. Melayu – Pulo Gebang	11.4	December 2011	380,000 (June)	114.783	
2012		0		390,000 (December)	111.251	
2013	12 Pluit – Tanjung Priok	23.8	February 2013		-	Ir. Joko Widodo, October 2012 onwards
	<b>Sub-total,</b>	<b>179km</b>				

Year	Corridor (date)	Length km (1)	Date	Patronage		Governor of DKI Jakarta
				Daily Pax (2)	Annual Pax (millions) from Transjakarta at end of year (3)	
	corridors 1-11	(reported as 180.2km at Dec 2012 by PIR)				
	Sub-total, corridors 1-12	202.9km				

Notes: (1) Lengths vary due to one sections of different lengths. Sourced for above are lengths for corridors 1-8 from Table 4.3, SDG (2011), corridors 11 and 12 from Wikipedia [[http://en.wikipedia.org/wiki/TransJakarta\\_Corridors](http://en.wikipedia.org/wiki/TransJakarta_Corridors)] accessed 30 Dec 2013, other lengths ITDP; (2) as reported by Annual PIRs except 2004, 2005 and 2006 estimated from annual figure and dividing by 304 equivalent weekdays per year; and (3) annual figures as provided by Transjakarta.

Beside the regular corridors, Transjakarta Busway also provides the following direct services across corridors including<sup>87</sup>:

- Corridor 2A (Pulo Gadung - Bundaran Senayan)
- Corridor 2B (Pulo Gadung - Kalideres)
- Corridor 3A (Kalideres - Bundaran Senayan)
- Corridor 5A (Ancol - Harmoni)
- Corridor 6A (Ragunan - Monas)
- Corridor 6B (Ragunan - Pulo Gadung)
- Corridor 7A (Cililitan - Harmoni)
- Corridor 7B (Cililitan - Ancol)
- Corridor 8A (Grogol - Harmoni)
- Corridor 9A (Cililitan - Grogol)

Two feeder services currently exist having being implemented in January 2013 using kopaja midibus services at fares of Rp, 5,000/ pax:

- Route 1: West Primary Center (Sentra Primer Barat) to Daan Mogot: Puri Indah Hospital, the West Java Municipal Office, Puri Market, Mutiara Kedoya, Kedoya Raya, Kembangan and Pesangrahan which connects with Corridor 3 (Kalideres–Harmoni) and Corridor 8 (Lebak Bulus – Harmoni); and
- Route 2: Tanah Abang to City Hall: Jatibaru, Abdul Muis, Medan Merdeka Barat and Fachruddin which connects with Corridor 1 (Blok M – Kota) and Corridor 2 (Pulo Gadung – Harmoni).

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<sup>87</sup> Source: [[http://en.wikipedia.org/wiki/TransJakarta\\_Corridors](http://en.wikipedia.org/wiki/TransJakarta_Corridors)] accessed 30 December 2013.

On March 28, 2012 Bekasi TransJakarta Feeder began serving from Bekasi Bus Station to Pulo Gadung Bus Station, and vice versa through Jakarta-Cikampek Toll Road. The ticket price is Rp 9,500 including TransJakarta ticket Bekasi Terminal;

## Annex 2: Persons Met and Contacted

**Monday, 2 December 2013 (11 am-3 pm)**

**Kick-off meeting at Dinas Perhubungan i.e. DisHub (11 am-noon)**

Names of person met	Function	Email address	Phone Number
Udar Pristono	Head of Dinas Perhubungan	dishub@jakarta.go.id u.pristono@yahoo.com	Tel: 021-3455264 / 021-3849491 Fax: 021-3848687
I Dewa Gede Sony Aryawan	Head of Traffic Controlling System Unit	NA	As above
Priyanto	Representative of Transjakarta	NA	As above
Benhard Hutajulu	Dishub Infrastructure subdivision	NA	As above

**ITS Centre at Dinas Perhubungan (1pm to 3pm)**

Names of person met	Function	Email address	Phone Number
I Dewa Gede Sony Aryawan	Head of Traffic Controlling System Unit	NA	As above

**Tuesday, 3 December 2013**

**BLU Transjakarta (11am-1pm)**

Names of person met	Function	Email address	Phone Number
Drs. Pargaulan Butarbutar	Head of BLU Transjakarta	<a href="mailto:pargaulanbutar2@gmail.com">pargaulanbutar2@gmail.com</a>	Tel: 021-80879449 Fax: 021-80879453
Ms Ulin	PR head	NA	As above
Priyanto	Representative of Transjakarta	NA	As above
Susilo Dewanto	NA	NA	As above

**Transjakarta, Indiii Consultants office (1pm – 2pm)**

Name of person	Function	Email address	Phone Number
Les Carter	Expert, Indll support to Transjakarta	lcarter@mrcagney.com	NA

**Hyatt Hotel (4pm-5pm)**

Names of person met	Function	Email address	Phone Number
Dave Tjahjana	Head BRT user group	Dave_chyn@yahoo.com	NA

**Wednesday, 4 December 2013****Hotel (10am-12pm)**

Names of person met	Function	Email address	Phone Number
Daryati Asriningsih Rini	Former Head of Transjakarta 2009-2011	riniekotomo@gmail.com	NA
Muhammad Akbar	Former Head of Transjakarta 2011-2013	akbarbusway@yahoo.co.id	NA

**Thursday, 5 December 2013****District Office of DKI Jakarta (10am-11am)**

Names of person met	Function	Email address	Phone Number
Muhammad Akbar	Former Head of Transjakarta 2011-2013	akbarbusway@yahoo.co.id	NA

**Dinas Perhubungan (12pm-2pm)**

Names of person met	Function	Email address	Phone Number
Richard Iles	Urban Transport Specialist/ teal leader, IndII	<a href="mailto:richard@iles.uk.com">richard@iles.uk.com</a>	NA
Richard Meakin	Institutional and Legal Specialist, IndII	<a href="mailto:rtmeakin@gmail.com">rtmeakin@gmail.com</a>	NA

**Friday, 6 Dec 2013****Regional Environment Management Board (9am-11am)**

Names of person met	Function	Email address	Phone Number
Tauchid	Former Head of Dishub (now Head of	NA	NA

	Regional Environment Management Board)		
Andono Warih	Head of Pollution Division	NA	NA

**Saturday, 7 December 2013****Hotel, various times**

Names of person called	Function	Email address	Phone Number
John Ernst	Former ITDP project director	ernst.john.p@gmail.com	By Skype
Peerke de Bakke	Peerke de Bakke	Peerke.Bakker@unep.org	By Skype

**Sunday, 8 December 2013**

Name of person	Function	Email address	Phone Number
Hans Fuhke	Head of GIZ SUTIP project, BAPPENAS	hans.fuhrke@giz.de	NA

**Monday, 9 December 2013****ITDP, DKI Jakarta Office (10am-11am)**

Name of person	Function	Email address	Phone Number
Azas Tigor Nainggolan	Dewan Transportasi Kota Jakarta (Jakarta's Transportation Council)	azastigor@yahoo.com	Tel/Fax. 021-63857987

**Hotel (7pm to 8pm)**

Name of person	Function	Email address	Phone Number
John Lee	IndII Transport Director	john.lee@indii.co.id	NA

**Tuesday, 10 December 2013**

**Transjakarta, Indiii Consultants office (10am – 11am)**

Name of person	Function	Email address	Phone Number
Restiti	Former Deputy Director of ITDP	<a href="mailto:restitititi@yahoo.com">restitititi@yahoo.com</a>	NA

**Transjakarta, Indiii Consultants office (11am – noon)**

Name of person	Function	Email address	Phone Number
Tom Elliott	Tom Elliott	<a href="mailto:telliott@mrcagney.com">telliott@mrcagney.com</a>	NA

**Wrap-up Meeting at Dinas Perhubungan i.e. DisHub (4pm-5pm)**

Names of person met	Function	Email address	Phone Number
Udar Pristono	Head of Dinas Perhubungan	<a href="mailto:dishub@jakarta.go.id">dishub@jakarta.go.id</a> <a href="mailto:u.pristono@yahoo.com">u.pristono@yahoo.com</a>	Tel: 021-3455264 / 021-3849491 Fax: 021-3848687
I Dewa Gede Sony Aryawan	Head of Traffic Controlling System Unit	NA	As above
Priyanto	Representative of Transjakarta	NA	As above
Benhard Hutajulu	Dishub Infrastructure subdivision	NA	As above
Drs. Pargaulan Butarbutar	Head of BLU Transjakarta	<a href="mailto:pargaulanbutar2@gmail.com">pargaulanbutar2@gmail.com</a>	Tel: 021-80879449 Fax: 021-80879453

**8 January 2014**

**Follow-up Meeting at DKI Jakarta**

Names of person met	Function	Email address	Phone Number
Ir. Hasan Basri Saleh, M.Sc	Assistant Economic Secretary	<a href="mailto:hasan.b.saleh@gmail.com">hasan.b.saleh@gmail.com</a> <a href="mailto:hasan@jakarta.go.id">hasan@jakarta.go.id</a>	Tel: 02-3850575 / 021-3823008 Fax: 021-3454574

**23 December 2014**

**Follow-up Meeting**

<b>Names of person met</b>	<b>Function</b>	<b>Email address</b>	<b>Phone Number</b>
Ms Milatia Kusuma	Former head of ITDP, Indonesia	crystalmila@gmail.com	0811886388

**15 January 2014**

**Follow-up Meeting at ITDP, Washington DC, USA**

<b>Names of person met</b>	<b>Function</b>	<b>Email address</b>	<b>Phone Number</b>
Walter Hook	Chief Executive Officer	walter.hook@itdp.org	+1-212-629-8001

**Other persons consulted or pre- and post-mission contacts**

<b>Person</b>	<b>Role</b>	<b>Topic of Discussion</b>	<b>Date of contact</b>	<b>Means of Contact</b>
Peerke de Bakker	UNEP Task Manager	Project details, reports, current status, supervision approach	15 Nov 2013	Email/Skype
David Hawes	Principal Sector Specialist: Infrastructure Department of Foreign Affairs and Trade (Australian Aid Program), Jakarta	Central government policies on BRT/ ERP and knowledge of Transjakarta	11 Nov 2013	email
Yoga Adiwinarto	ITDP Jakarta	Various	Various	Email and face to face
UNEP Evaluation Office	Michael Carbon	Various relevant reports and advice	Various	Email/ Skype
UNEP	Faith Karuga (for Paul Vrontamitis) – financial information	Financial reports		Email

## Annex 3. Actual Project Costs and Co-Financing

The estimated project costs at project close and associated funding sources are presented below.

### Project Costs

Component/sub-component	Estimated cost at design	Actual Cost	Expenditure ratio (actual/planned)
1100 Project Personnel	462,465	466,186	0.99
1200 Consultants	549,101	446,619	1.23
1600 Travel on official business (above Staff)	80,252	75,164	1.07
2200 Sub-contracts	435,613	407,483	1.07
2300 Sub-contract (commercial purposes)	134,704	134,303	1.00
3200 Group training	3,481,198	3,638,679	0.96
3300 Meeting / Conferences	312,776	300,586	1.04
4100 Expendable equipment	29,010	19,682	1.47
4200 Non-expendable equipment	27,353	23,888	1.15
4300 Premises	71,920	70,356	1.02
5100 Operation and maintenance of equip,	7,913	7,835	1.01
5200 Reporting costs	73,193	77,172	0.95
5300 Sundry	28,712	26,257	1.09
5500 Evaluation	117,791	117,791	1.00
<b>Total</b>	<b>5,812,000</b>	<b>5,812,000</b>	<b>1.00</b>

Source: ITDP, November 2013

## Co-financing

Co financing (Type/Source)	IA own Financing (mill US\$)		Government (mill US\$)		Other* (mill US\$)		Total (mill US\$)		Total Disbursed (mill US\$)
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	
- Grants	0.0	0.089	187	419	0.0	0.367	n.a.	235,724	235.724
- Loans									
- Credits									
- Equity investments									
- In-kind support									
- Other (*) - -									
<b>Totals</b>	<b>0.0</b>	<b>0.089</b>	<b>Exact amount not known</b>	<b>235,269</b>	<b>0.0</b>	<b>0.367</b>	<b>n.a.</b>	<b>235,724</b>	<b>235.724</b>

\* This refers to contributions mobilised for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries. A list of these agencies is set out below.  
Source: ITDP, November 2013

The following organizations provided co-financing in terms of contributions for venue hire and related meeting and workshop expenses:

### Organization

- 1 Agency for Technology Assessment & Application (BPPT)
- 2 BLU Transjakarta
- 3 City Government of Pekanbaru
- 4 Coordinating Ministry of Economics & Finance
- 5 Jakarta Public Transport Council
- 6 Jakarta Public Works Agency
- 7 Jakarta Transport Agency
- 8 Jakarta Park & Cemetery Agency
- 9 Office of North Jakarta Mayor
- 10 Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- 11 Bike2Work Communities

### Type

- Government
- Government Enterprise
- NGO

12 FAKTA	NGO
13 Greenmap	NGO
14 Indonesian Architect Institute	NGO
15 Indonesian Transport Society (MTI)	NGO
16 Suaratransjakarta	NGO
17 @America	Private Sector
18 FX Shopping Mall	Private Sector
19 Greenradio	Private Sector
20 JakTV	Private Sector
21 Kopitiam Oey	Private Sector
22 PT Cocacola Bottling Indonesia	Private Sector
23 PT Mortar Utama	Private Sector
24 PT Summarecon	Private Sector

## Annex 4: Objectives, Outcomes and Milestones Used in Design and Implementation Reporting

Original Objectives	Original Outcomes and Outputs	Original Milestones (reported in 6 monthly Progress Reports)	Performance Indicators in Annual PIRs	Modified Milestones, after MTE (reported in 6 monthly Progress Reports)
<p><b>Goal A: Improve Performance of the Jakarta BRT</b></p> <p><i>Objective 1: Develop BRT Corridors 4-14</i></p>	<ul style="list-style-type: none"> <li>• <b>Outcome:</b> BRT implemented on corridors 1-14 with routes optimized</li> <li>• <b>Output:</b> 600,000 additional BRT pax/ day, 263,000 Tonnes CO2-e reduced per year</li> </ul>	<ul style="list-style-type: none"> <li>• Jakarta BRT Corridors 4-7 Implemented in Year 1</li> <li>• Jakarta BRT Corridors 8-11 Implemented in Year 2</li> <li>• Jakarta BRT Corridors 11-14 Implemented in Year 3</li> </ul> <p><b>Target:</b> All 14 routes completed within 5 years. Routes optimized to achieve maximum demand</p> <p><b>Baseline:</b> 6 BRT corridors implemented by year 2. Sub-optimal implementation means a significant % of public transit users find standard routes more convenient. BRT lanes removed by year 5.</p>	<p><b>Objective:</b></p> <ul style="list-style-type: none"> <li>• Number of corridors operating</li> <li>• km of busway</li> </ul> <p><b>Outcome</b></p> <ul style="list-style-type: none"> <li>• BRT system ridership (daily - averaged for most recent month)</li> <li>• Passenger-km on BRT (daily)</li> <li>• average passenger trip length (km)</li> <li>• Liters of fuel consumed per BRT passenger km</li> <li>• bus fuel usage - liters/km</li> <li>• passengers per bus km</li> </ul>	<ul style="list-style-type: none"> <li>• Corridor 9 &amp; 10: improving safety and reducing delay, recommendation report by 30 November 2010</li> <li>• Corridors 11 &amp; 12: station design recommendations, corridor routing review, bus requirement recommendation by 31 January 2011</li> <li>• Station makeover</li> <li>• Design manual and specification documents for busway lanes, stations and buses by 31 May 2011</li> </ul>

Original Objectives	Original Outcomes and Outputs	Original Milestones (reported in 6 monthly Progress Reports)	Performance Indicators in Annual PIRs	Modified Milestones, after MTE (reported in 6 monthly Progress Reports)
<p><i>Objective 2: Optimize Fare System for Corridors 1-14</i></p>	<p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>• Integrated fare system with controls stops fare leakage.</li> <li>• Competitive contracting implemented for BRT bus operation, reducing costs</li> </ul> <p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>• 105,000 additional BRT pax/ day</li> <li>• 46,000 Tonnes CO2-e reduced per year (Comment by TE: never separately reported)</li> </ul>	<ul style="list-style-type: none"> <li>• Transjakarta become legal entity able to control fare revenue in Year 2</li> <li>• Fare system control mechanisms implemented in Year 3</li> <li>• Competitive tender for fare system and bus operations implemented in Year 4 (did not happen for ticket system – note mix of terms).</li> </ul> <p><b>Target:</b> Integrated fare system with controls stops fare leakage. Competitive contracting implemented for BRT bus operation, reducing costs (para. 96)</p> <p><b>Baseline:</b> Non-integrated fare system with inadequate controls results in fare leakage and continued use of non-competitive bids for BRT operation</p>	<p><b>Objective:</b> Nil</p> <p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>• Passenger-km (additional to Objective 1)</li> <li>• Amount paid (Rupiah/km) to BRT operators (non-articulated bus)</li> </ul>	<ul style="list-style-type: none"> <li>• Terms of reference for fare collection system by 31 December 2010</li> <li>• Draft regulations for fare adjustment formula and procedure by 31 May 2011</li> <li>• Draft regulations for integrated fare collection system by 30 June 2011</li> <li>• Budget approval for tendering ticketing system in 2012 by 31 December 2011</li> </ul> <p><b>New objective added for progress reporting: Institutional Improvement of Transjakarta</b></p> <ul style="list-style-type: none"> <li>• New Regulation to replace Governor Decree No. 123/2006 on bus operator procurement by 30 September 2010</li> <li>• Transjakarta Restructuring team established by 31 December 2010</li> <li>• Contract signed between DKI and Transjakarta and management instruction issued by Governor by 31 March 2011</li> <li>• Academic paper on business plan in preparation for regulation by 30 April 2011</li> </ul>

Original Objectives	Original Outcomes and Outputs	Original Milestones (reported in 6 monthly Progress Reports)	Performance Indicators in Annual PIRs	Modified Milestones, after MTE (reported in 6 monthly Progress Reports)
				<ul style="list-style-type: none"> <li>• Position specifications, training system, and staff assessment by 31 May 2011</li> <li>• Local Regulation (Perda) issued by city parliament by 30 June 2011</li> <li>• BUMD Governing Board established, Charter for Board Commissioner, Charter for Board of Directors, Code of Conduct for Governing Body by 31 July 2011</li> <li>• Governor sign draft decree of Minimum Services Standard (MSS) by 31 August 2011</li> <li>• Monitoring report of MSS implementation by 30 November 2011</li> <li>• Channeling mechanism for funds is established by 31 December 2011</li> </ul>
<p><i>Objective 3: Improve Intersection Performance for BRT</i></p>	<p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>• Intersection conflicts reduced to acceptable levels. BRT average speed increases to 25km/hr.</li> <li>• Improved political support for BRT by reducing impacts on mixed traffic</li> </ul>	<ul style="list-style-type: none"> <li>• Intersection reforms implemented in Year 4 and Year 5</li> </ul> <p><b>Target:</b> Intersection conflicts reduced to acceptable levels. BRT average speed increases to 25km/hr (note: comment by TE – <i>actual speed at end of project was 20kph as shown in FY</i></p>	<p><b>Objective:</b> Nil</p> <p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>• BRT average speed (km/h)</li> <li>• BRT passengers/day (additional to previous objectives)</li> </ul>	<ul style="list-style-type: none"> <li>• Review of conflict areas; Feasibility study of BRT only overpass/underpass construction by 30 November 2011</li> <li>• Busway exclusive lane public relation campaign by installing 200 stickers on the buses and</li> </ul>

Original Objectives	Original Outcomes and Outputs	Original Milestones (reported in 6 monthly Progress Reports)	Performance Indicators in Annual PIRs	Modified Milestones, after MTE (reported in 6 monthly Progress Reports)
	<p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>• 5km/hr BRT average speed increase</li> <li>• BRT pax. increase by 118,000 per day</li> <li>• 46,000 Tonnes CO2-e reduced per year (Comment by TE: never separately reported)</li> </ul>	<p><i>PIR that still is acceptable viewed against growing vehicle ownership).</i></p> <p><b>Baseline:</b> Intersections continue to cause conflicts that increase with system expansion, slowing average BRT speed to 18 km/hr)</p>		<p>50 banners at pedestrian bridge by 30 April 2011</p> <ul style="list-style-type: none"> <li>• Three (3) reports on monitoring of enforcement of Busway exclusive lane program by conducting corridor travel time surveys, 30 November 2010, 30 April 2011 and 30 November 2011</li> </ul> <p>New sub-objective added for progress reporting: <b>Provide Adequate Supply and Quality of CNG for BRT</b></p> <ul style="list-style-type: none"> <li>• 2 CNG supply research summary report by 30 November 2010</li> <li>• Issuance of Decree on price and supply by 31 December 2010</li> <li>• Bus average filling time (including travel) is less than 20 minutes by 30 October 2011</li> </ul>
<p><i>Objective 4: Optimize Busway Operation</i></p>	<p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>• Increased average speed of BRT</li> <li>• 5% reduction of fleet downtime, reduced operating costs</li> <li>• 8% reduction in fuel consumption</li> </ul> <p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>• Average speed of BRT improves</li> </ul>	<ul style="list-style-type: none"> <li>• Operation reforms implemented in Years 2, 3 4 and 5</li> </ul> <p><b>Target:</b> Operation optimized to maximize service to passengers and reduce waiting and transfer times.</p> <p><b>Baseline:</b> BRT buses bunch during operation. 1-door bus and station design slow boarding/alighting.</p>	<p><b>Objective:</b> Nil</p> <p><b>Outcome 1:</b></p> <ul style="list-style-type: none"> <li>• BRT average speed (km/h)</li> <li>• BRT passengers/day (additional to previous objectives)</li> </ul>	<ul style="list-style-type: none"> <li>• Term of reference for control room and system by 30 November 2010</li> <li>• Report of Singapore Land Transport Authority training on bus control system by 31 December 2010</li> <li>• Control room created by DKI</li> </ul>

Original Objectives	Original Outcomes and Outputs	Original Milestones (reported in 6 monthly Progress Reports)	Performance Indicators in Annual PIRs	Modified Milestones, after MTE (reported in 6 monthly Progress Reports)
	from 25 to 28k km/hr <ul style="list-style-type: none"> <li>• 133,000 additional BRT pax/day</li> <li>• 64,000 Tonnes CO2-e reduced per year (Comment by TE: never separately reported)</li> </ul>	Crowded conditions limit passengers.	<b>Outcome 2:</b> <ul style="list-style-type: none"> <li>• Proportion of buses reserved by operators for downtime</li> <li>• Fuel consumption of buses (liters/km)</li> </ul>	Jakarta functioning by 31 August 2011 <ul style="list-style-type: none"> <li>• Software purchased, installed and operational in control room by 31 October 2011</li> </ul>
<b>Goal B: Utilize BRT to build image of public transport and improve pedestrian, TDM, NMT, and land use options</b>				
<i>Objective 5: Improve public perception of BRT</i>	<b>Outcomes:</b> <ul style="list-style-type: none"> <li>• Public understanding of BRT and optimal use of public road space increased.</li> <li>• Web and SMS based routing information system available to potential passengers</li> </ul> <b>Outputs:</b> <ul style="list-style-type: none"> <li>• 96,000 additional BRT passengers/day</li> <li>• 42,000 Tonnes CO2-e reduced per year (Comment by TE: never separately reported)</li> </ul>	<ul style="list-style-type: none"> <li>• Public transit routing information system implemented in Year 4</li> </ul> <b>Target:</b> Web and SMS based routing information system available to potential passengers. <b>Baseline:</b> No source of information on best route for point-to-point service by public transport.	<b>Objective:</b> Nil <b>Outcomes:</b> <ul style="list-style-type: none"> <li>• BRT passengers/day (additional to previous objectives)</li> <li>• Information system deployed.</li> </ul>	<ul style="list-style-type: none"> <li>• Transjakarta communications with passengers via internet and SMS, quarterly statistic report by 31 December 2010, 31 March 2011, 30 June 2011, and 30 September 2011</li> <li>• Corridor 9 &amp; 10: route launching public relations, press release and report of corridors 9 &amp; 10 by 31 January 2011</li> <li>• Quarterly report of front liner awards by 31 December 2010, 31 March 2011, 30 June 2011, and 30 September 2011</li> <li>• Report of campaign program to 5 schools by 31 May 2011</li> <li>• Media strategy training report 30 June 2011</li> </ul>

Original Objectives	Original Outcomes and Outputs	Original Milestones (reported in 6 monthly Progress Reports)	Performance Indicators in Annual PIRs	Modified Milestones, after MTE (reported in 6 monthly Progress Reports)
<i>Objective 6: Rationalize Non-BRT Bus Routes</i>	<p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>Increase of passenger from bus feeder system from 5% to 50% of BRT passengers; of which 32% are new passengers and 32% shifted from PMV feeder</li> <li>Reduce PMV feeder trips and increasing total BRT passengers</li> </ul> <p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>200% increase in additional BRT passengers/day</li> <li>50% reduction in BRT pax. using private motor vehicles as feeder: 250,000 fewer PMV km/day (Comment by TE: never measured)</li> <li>1,050,000 fewer PMV feeder trips per day (Comment by TE: never measured)</li> <li>114,000 Tonnes CO2-e reduced per year (Comment by TE: never separately reported)</li> </ul>	<ul style="list-style-type: none"> <li>New, rationalized, bus routes established in Jakarta in Year 5</li> </ul> <p><b>Target:</b> 50% of BRT passengers from bus feeder service; 32% of which are new passengers and 32% shifted from PMV feeder</p> <p><b>Baseline:</b> 5% of BRT passengers from bus feeder services and 20% from PVM feeder</p>	<p><b>Objective:</b> Nil</p> <p><b>Outcome 1:</b></p> <ul style="list-style-type: none"> <li>BRT passengers using bus feeder</li> </ul> <p><b>Outcome 2:</b></p> <ul style="list-style-type: none"> <li>BRT passengers using PMV feeder</li> <li>Km of PMV feeder trips</li> </ul>	<p><b>Objective renamed and scoped: Establish mechanism for creating feeder system for Transjakarta</b></p> <ul style="list-style-type: none"> <li>Updated transport model by 28 February 2011</li> <li>Business model by 30 July 2011</li> <li>Training of private operator routing reform conducted by 28 February 2011</li> <li>Pilot bus feeder route action plan recommendations by 30 August 2011, City budget allocation by 1 June 2012</li> </ul>
<i>Objective 7: Evaluate and Implement Transport Demand Management Measures to Reduce Private Motor Vehicle Use</i>	<p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>TDM measure implemented so that cost of PMV use is greater than BRT fare</li> </ul>	<ul style="list-style-type: none"> <li>Road pricing TDM scheme implemented in Jakarta in Year 5</li> </ul> <p><b>Target:</b> TDM measure implemented so that cost of PMV use is greater than</p>	<p><b>Objective:</b> Nil</p> <p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>TDM charge for operating PMV on</li> </ul>	<ul style="list-style-type: none"> <li>Road pricing strategy paper by 31 December 2010</li> <li>Draft regulation completed by 31 July 2011, Regulation passed by parliament by 31</li> </ul>

Original Objectives	Original Outcomes and Outputs	Original Milestones (reported in 6 monthly Progress Reports)	Performance Indicators in Annual PIRs	Modified Milestones, after MTE (reported in 6 monthly Progress Reports)
	<p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>• TDM charge for operating PMV on congested portions of BRT corridors</li> <li>• 72,000 additional BRT passengers/day</li> <li>• Doubling of pax. from PMV from 25% to 50% (reported)</li> <li>• 1,050,000 fewer PMV feeder trips per day</li> <li>• 913,000 Tonnes CO2-e reduced per year (Comment by TE: 4 of above never measured and some not reported at all)</li> </ul>	<p>BRT fare</p> <p><b>Baseline:</b> Three-in-one (carpooling) system continues to operate</p>	<p>congested portions of BRT corridors</p> <ul style="list-style-type: none"> <li>• BRT passengers/day (additional to previous objectives)</li> <li>• Number of Daily BRT passengers whose previous mode was PMV</li> </ul>	<p>December 2011</p> <ul style="list-style-type: none"> <li>• Public discussions report by 31 May 2011</li> <li>• Parking strategy paper by 31 January 2011</li> <li>• Draft regulations completed by 31 July 2011, Regulation passed by parliament by 31 March 2012</li> </ul>
<p><i>Objective 8: Improve Pedestrian, NMT Facilities and Land Use in Center and Along Corridors</i></p>	<p><b>Outcomes:</b></p> <ul style="list-style-type: none"> <li>• Convenient NMT and pedestrian trips increases BRT trips</li> <li>• Increased feeder trips bicycle</li> </ul> <p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>• Additional BRT pax. from pedestrian and bike connections</li> <li>• 246,000 fewer PMV kms as feeder and short-distance trips</li> <li>• 39,000 Tonnes CO2-e reduced per year (Comment by TE: never reported)</li> </ul>	<ul style="list-style-type: none"> <li>• Plaza Fatahillah pedestrian area implemented near Jakarta "Kota" BRT station in Year 2</li> <li>• Secure bike parking areas established at 4 BRT stations in Year 3</li> <li>• Redevelopment plans agreed to for Plaza Fatahillah as transit oriented development in Year 4</li> <li>• Pedestrian improvements achieved within 200 meters of all BRT stations in Year 5</li> </ul> <p><b>Target:</b> Convenient NMT and pedestrian trips increases overall use</p>	<p><b>Objective:</b> Nil</p> <p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>• BRT passengers with walking or bicycle connecting trips</li> <li>• Amount of PMV kms as feeder and short-distance trips</li> </ul>	<ul style="list-style-type: none"> <li>• Private developer NMT seminar report by 28 February 2011</li> <li>• Pedestrian awareness campaign (catwalk) event report by 30 June 2011</li> <li>• Independent pedestrian sidewalk condition survey report by 31 October 2010</li> <li>• Plan for pedestrian improvement agreed by 30 November 2010, include in 2011 budget by 31 December 2011</li> <li>• North Jakarta bike lane, Press</li> </ul>

Original Objectives	Original Outcomes and Outputs	Original Milestones (reported in 6 monthly Progress Reports)	Performance Indicators in Annual PIRs	Modified Milestones, after MTE (reported in 6 monthly Progress Reports)
		<p>of BRT and NMT connecting modes</p> <p><b>Baseline:</b> Poor pedestrian facilities throughout Jakarta; Inconvenient pedestrian NMT connecting trip to BRT forces increased use of private car and tax</p>		<p>statement from mayor supporting bike lane by 31 December 2010, Pilot lane location agreed to by 28 February 2011, Detailed design of bike lane by 31 May 2011, budget for implementation of bike lane in mid 2012 by 31 August 2011</p> <ul style="list-style-type: none"> <li>• Location agreed to for bike parking by 28 February 2011, detailed design of bike parking area by 31 May 2011, budget for implementation of parking area by 31 August 2011</li> </ul>
<p><i>Objective 9: Dissemination and Outreach to Other Cities (1 city – not two as stated in several places in Project Document)</i></p>	<p><b>Outcome:</b> Full BRT implemented in 1 of target cities; BRT draws some passengers from private motor vehicles. Or increased number of students walking and biking to school increased use of bicycle for short trips</p> <p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>• 30,000 additional daily trips by public transit or 150,000 fewer short motorcycle km/year</li> <li>• 15,000 Tonnes CO2-e reduced per year (Comment by TE: never reported)</li> </ul>	<ul style="list-style-type: none"> <li>• Achieve fully developed plans for a BRT system, pedestrian zone, and/or NMT facility in at least 1 other city by Year 4.</li> </ul> <p><b>Target:</b> Improvements implemented in 1 of target cities</p> <p><b>Baseline:</b> No public transport , pedestrian or NMT improvement</p>	<p><b>Objective:</b> Nil</p> <p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>• BRT established</li> </ul>	<ul style="list-style-type: none"> <li>• Pekanbaru institutional strengthening by creation of full BLU for Transmetro Pekanbaru, preparation of business model for BLU by 31 January 2011, Minimum Service Standard by March 2011, Financial Reporting system by 31 March 2011, Asset management by 31 May 2011, and Mayoral Decrees on processes by 2011</li> <li>• Training course reports for business process by 28 February 2011</li> <li>• Revised contract for operators by 31 March 2011</li> </ul>

Original Objectives	Original Outcomes and Outputs	Original Milestones (reported in 6 monthly Progress Reports)	Performance Indicators in Annual PIRs	Modified Milestones, after MTE (reported in 6 monthly Progress Reports)
				<ul style="list-style-type: none"><li>• Control system concept by 30 April 2011</li><li>• Four events reports regarding public relations for Transmetro Pekanbaru in community by 31 May 2011</li><li>• Two events reports regarding bicycling promotion in Pekanbaru by 30 June 2011</li></ul>

## Annex 5: Reconstructed TOC

Figure 1: Reconstructed Theory of Change

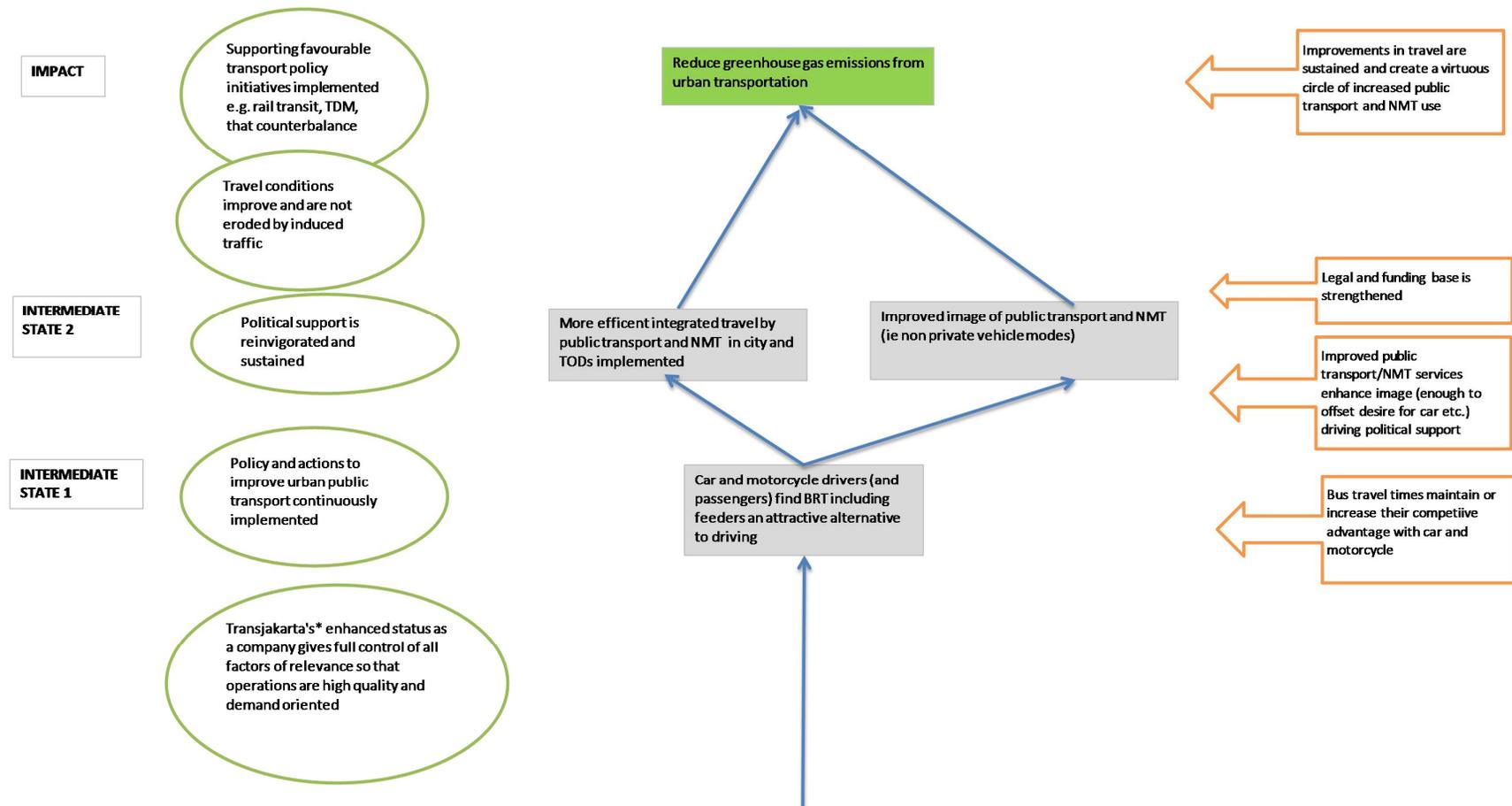
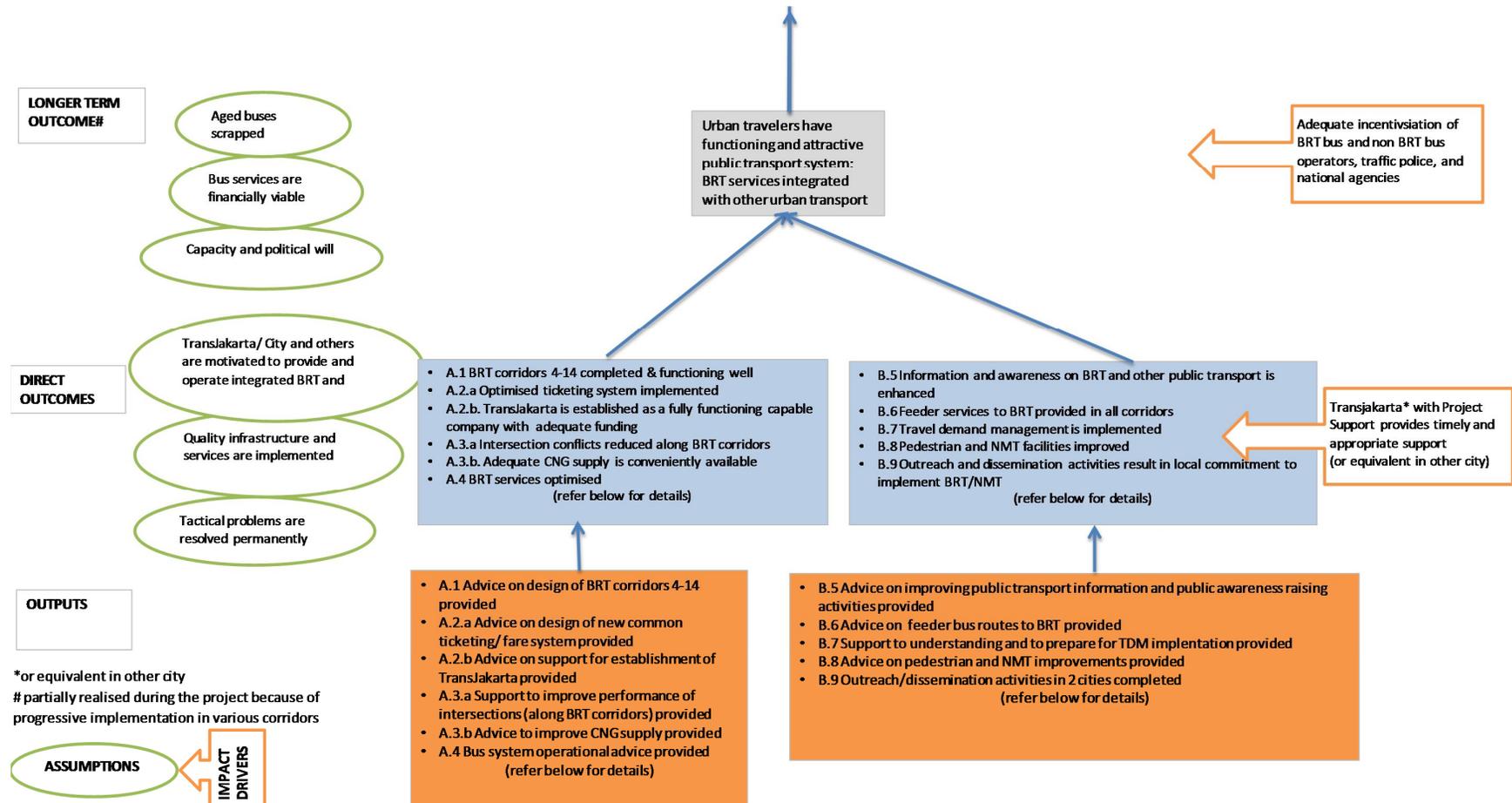


Figure 1 (cont): Reconstructed Theory of Change



\*or equivalent in other city  
 #partially realised during the project because of progressive implementation in various corridors

**Figure 1 (cont): Reconstructed Theory of Change**

<b>Level of Outcome</b>	<b>Indicators</b>
Impact	GHG emissions from urban transport
Intermediate State 2	Public transport/NMT mode share % of persons who rate BRT and other buses as good or better No. of successful TODs implemented
Intermediate State 1	% of pax. represented by former car and motorcycle drivers O-D travel times by bus compared to that by car and motorcycle (use travel to CBD as proxy) Project-related GHG/ local emissions reduced
Longer Term Outcome	Transjakarta established as company Public transport pax. nos. % of BRT users accessing stations using NMT/ bus No. of buses scrapped % of passengers who rate BRT as good or better Bus cost recovery
Direct Outcomes	No. of corridors implemented Ticketing system implemented Transjakarta is established as company No. of intersections improved

	<p>% of feeder services provided of planned</p> <p>Dead running km as % of total needed to access CNG supply</p> <p>Average bus speed improved</p> <p>Public awareness of BRT and public transport increased</p> <p>% of planned feeder services provided</p> <p>TDM is implemented</p> <p>No. of planned NMT and pedestrian improvements realised</p> <p>No. of cities in which planned outreach activities completed</p>
Outputs	Indicators are extent to which outputs are provided - see details below

Figure 1 (cont): Reconstructed Theory of Change

<b>DETAILS FOR DIRECT OUTCOMES</b>			
<b>A.1 BRT corridors 4-14 completed &amp; functioning well</b> Corridors 4-7 Corridors 8-11 Corridors 11-14 No. of improved stations implemented or madeover BRT design manual applied	<b>A.2a Optimised ticketing system functioning</b> Ticket system for all corridors implemented Regulation for integrated fares implemented Budget for ticketing system approved	<b>A.2.b TransJakarta is established as a fully functioning capable company</b> TransJakarta achieves BUMD status with full functional/geographic span of responsibility, capable staff, and funding Local regulation implemented Decree on Minimum Service Standards implemented New regulation on bus service contracts & procurement implemented Business plan adopted, management systems in place & operational Restructuring team established and completes work Funding mechanism established	<b>A.3.a Intersection conflicts reduced along BRT corridors</b> Intersections improved along BRT corridors Corridors 4-7 Corridors 8-11 Corridors 11-14 Bus lanes illegal use enforced along corridors
<b>DETAILS FOR OUTPUTS</b>			
<b>A.1 Advice on design of BRT corridors 4-14 provided</b> Surveys and public transport modelling completed Training in modelling and BRT routing completed Design workshop completed Detailed design plans completed Station makeover recommendations completed	<b>A.2.a Advice on design of new common ticketing etc. provided</b> TOR for ticket and fare system completed Draft regulation for integrated fares completed Legal advice for procurement of ticketing system provided	<b>A.2.b Advice on support for establishment of TransJakarta provided</b> Academic paper on business plan prepared Advice on restructuring provided Advice on position descriptions, training and staff capability provided	<b>A.3.a Advice on reducing conflicts, enforcing illegal use provided</b> Baseline measurements undertaken at intersections Improvement proposals prepared
<b>DETAILS FOR DIRECT OUTCOMES (cont)</b>			
<b>A.3.b. Adequate CNG supply is conveniently available</b> Refueling times are less than 20 minutes Number of refuelling stations is increased Decree on price and supply of CNG implemented	<b>A.4 BRT services optimised</b> Bus control centre is implemented & functional Appropriate software and hardware is provided Capable staff operate control centre Communications link with buses established MoU with police on enforcement protocol established	<b>B.5 Information/awareness on BRT &amp; other PT is enhanced</b> TransJakarta implements/ improves communications with pax. via SMS/ Internet TransJakarta creates a PR position and fills it Adequate budget provided for PR etc. activities	<b>B.6 Feeder services to BRT operated in all corridors</b> Bus feeder services implemented according to action plan TransJakarta staff have capacity in bus feeder design, procurement and operations Adequate budget is provided to support feeder bus Legal base for feeder services sound
<b>DETAILS FOR OUTPUTS</b>			
<b>A.3.b. Advice to improve CNG supply provided</b> Research paper on '2 CNG supply' prepared	<b>A.4 Bus system operational advice provided</b> ToR for control system requirements prepared Singapore LTA report on bus control system prepared	<b>B.5 Advice on improving PT information/ public awareness pvd.</b> Media study training prepared Annual focus groups & survey of pax. /non-pax completed Training on PR education & route info. In Jakarta, other cities provided Annual training for TransJakarta, NGOs, others provided	<b>B.6 Advice on feeder bus routes to BRT provided</b> Transport model updated and applied for bus feeder design Bus feeder action plan prepared Bus feeder business plan prepared Training to TransJakarta provided on feeder services

Figure 1 (cont): Reconstructed Theory of Change

<b>DETAILS FOR DIRECT OUTCOMES (cont)</b>		
<p><b><i>B.7 Travel demand management is implemented</i></b>            Road pricing scheme implemented            Parking measures implemented            Legal basis for road pricing and taxation implemented</p>	<p><b><i>B.8 Pedestrian/NMT facilities improved in Jakarta/ other cities</i></b>            Pedestrian improvements implemented within 200m of BRT stations along:            Corridors 4-7            Corridors 8-11            Corridors 11-14            Secure bike parking provided at 4 BRT stations            Pedestrian improvements implemented at Plaza Fatahillah            North Jakarta bike lane operating</p>	<p><b><i>B.9 Outreach and dissemination activities result in local commitment to implement BRT/NMT (1 city)</i></b>            No. of cities demonstrating ownership &amp; commitment for BRT and NMT implementation</p>
<b>DETAILS FOR OUTPUTS</b>		
<p><b><i>B.7 Travel demand management measures evaluated</i></b>            Road pricing strategy prepared            Parking strategy prepared            Draft regulations for road pricing etc. prepared            Public discussions completed            Study tours completed</p>	<p><b><i>B.8 Advice on pedestrian and NMT improvements provided</i></b>            Pedestrian facilities condition/movement survey completed            Training in pedestrian/NMT demand/ design completed in Jakarta and other city            Design plans prepared for pedestrian &amp; NMT facilities            Awareness campaign on pedestrian/ walkability completed</p>	<p><b><i>B.9 Outreach/ dissemination activities in at least 2 cities completed</i></b>            Plans for BRT, pedestrian zone, NMT prepared            Training courses delivered            Business model / institutional strengthening plans prepared</p>

## Annex 6: Description of Achievement of Outputs and Direct Outcomes, and Ratings

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### Details for Direct Outcome A.1

**A.1 BRT corridors 4-14 completed & functioning well (Rating: 5, summary: 12 corridors implemented, 2 below target. Quality generally 'basic' according to ITDP rating system).**

#### Corridors 4-7

Corridors 4-7 (51km) began operation in January 2007. ITDP technical report supported corridors chosen. In 2012, ITDP applied their then rating system and found 1 was bronze, 2 was basic and 3 & 4 were bronze (Gold is highest, silver is 2nd highest, and bronze, 3rd highest; basic means did not rate at bronze or higher) .

#### Corridors 8-11

Corridors opened as follows: 8 (2007); 9 & 10 (2010); 11 (2011) - rated basic, basic, bronze, basic respectively in 2012. Total BRT network was 183.3km with 240 stations. Main reason quality was rated lower was the quality of operations and 'universal access' were rated poorer .

#### Corridors 12-14

Corridor 12 (18km) and 10 new stations opened in February 2013 (post project). Corridor 13 scheduled for FY14. Other corridors scheduled post 2013.

#### No. of improved stations implemented or madeover

Nil but stations designed in all corridors 5-14, consistently achieved a high score, the same as corridor 1 and higher than corridors 2 & 3 in ITDP rating system – reflects use of BRT design manual to some extent.

#### BRT design manual applied

Yes.

### Details for Output A.1

#### A.1 Advice on design of BRT corridors 4-14 provided

##### Surveys and public transport modelling completed

Yes – in 2011/ 12 for direct feeder study (3,400 sample pax. interviews).

##### Training in modelling and BRT routeing completed

Yes.

##### Design workshop completed/ BRT Manual prepared

Yes, manual prepared, design plans prepared

##### Station makeover recommendations completed

Pilot shelter makeover completed April 2011, none others implemented.

### Details for Direct Outcome A.2

**A.2a Optimised ticketing system functioning (Rating: 2, summary: partial ticket system implemented but not according to ITDP specification. System is too slow for transit operation & likely not sustainable).**

**Ticket system for all corridors implemented**

No. Transjakarta entered into a contract with Bank-DKI to provide an e-ticketing system. Bank-DKI's tender was won by a contractor who implemented a system in corridors 4 and 6 only and did not complete the rest of corridors that still used the paper ticket system at end of project. In January 13, Bank-DKI and four other banks at behest of the Governor and MoF, paid \$4M for an e-payment system (using prepaid or other bank cards) to be implemented for no cost to Transjakarta or government. Contracts between the Banks and Transjakarta were arranged for supply of finance, supported by a contract between a contractor GAMA (a subsidiary of Gaja Mada University, Yogyakarta) and Transjakarta for the five year supply and operation of an e-payment card system; and a contract between GAMA and the banks for security aspects. Corridors 4 and 6 were not implemented due to a legal dispute with the previous contractor and Bank-DKI. A sixth bank joined the consortium of banks in December 2013. The system is likely inflexible in that other fare structures may not be easily implemented. There are also possible issues surrounding future sustainability - are the bank's willing to expand the system for no cost? However, the 'e-money' cards can be purchased at convenience stores, used for toll payments and purchases at convenience stores. At time of TE, reported users were between 9,000 and 20,000/day or not more than 5% of daily trips. Transaction times are in excess of 1sec/pax and vary by bank which is too slow for high volume urban transit operations that need times of less than 0.2 secs per/pax.

**Regulation for fare adjustment implemented**

No, fare is same flat fare of Rp 3,500 per pax entry to system as in 2004.

**Regulation for integrated fares implemented**

No.

**Budget for ticketing system approved**

No.

Details for Output A.2

**A.2.a Advice on design of new common ticketing etc. provided****ToR for ticket and fare system completed**

Yes by December 2010.

**Draft regulation for fares adjustment completed**

70% completed. Mentioned in local regulation of BRT System Management but not implemented at project close.

**Draft regulation for integrated fares completed**

70% completed. Mentioned in local regulation of BRT System Management but not implemented at project close.

**Legal advice for procurement of ticketing system provided**

Yes.

Details for Direct Outcome A.2b

**A.2.b Transjakarta is established as a fully functioning capable company (Rating 4, summary: BUMD, a government owned company, was established in January 2014, much later than**

**intended, but questions remain about its efficacy given incomplete use of potential of earlier organisation structures. Nevertheless, it is a very positive step).**

Partially, but on 30 December 2013 during the TE, DKI Jakarta's parliament ratified the bylaw on Transjakarta's conversion to a Badan Usaha Milik Daerah, with a view to its formation in January 2014. A board of professional independent directors is to be appointed. A related bylaw on Management of BRT was also approved. At time of TE mission in December 2013, having commenced work at the end of the UNEP project, Australia's Indonesian Infrastructure Initiative (IndII) consultants were working on a proposed conversion plan: (i) updating draft regulations prepared by ITDP; (ii) preparing a new business and financial plan; and (iii) advising on human resources. (Note: the Project Design Document described Transjakarta as a "publicly-controlled private corporation under the control of the Jakarta government" which was not correct). In fact, during project design, Transjakarta was a special unit under the governor called a Badan Pelaksana (BP). In May 2006, it was converted to a Badan Layanan Umum (BLU)/ Unit Pelaksana Technis (UPT) by Governor Decree No. 48 Year 2006 (dated: 4 May). It only had to have a head/director and the Treasury Head from Government while the rest of staff could be private. But this was not done at management level. It may be described as a half BLU. It could not retain revenue for use in purchasing bus services and instead revenues were remitted to DKI's central revenue. In 2010, Transjakarta was converted to a full BLU, under Decree 626, that with its own bank account and ability to use fare revenues for its operations. In 2011 it was converted again to UP (Unit Pengelola) under Decree 52. A UP can own assets, retain revenues, and act as a management agency. In the way implemented, the top 5 management positions were reserved for civil servants where staffing is decided by DisHub – not by Transjakarta. Staff had been rotated four times since 2011. Governor Decree No. 148/2011 to accelerate BUMD for Transjakarta was issued on 31 January 2011. It took to December 2013 until DKI Jakarta's parliament approved the creation of the BUMD.

#### **Span of responsibility, capable staff, and funding**

Under the duration of UNEP/ GEF assistance, the then staff did increase in capability, solve problems affecting creation of bus lanes on national roads, design of bus stations, retention of fare revenue to use for purchase of bus services. Substantial funding is provided every year but there is no forward medium term financial plan combining capital with recurrent budget needs.

#### **Local regulation implemented (to create Transjakarta as BUMD)**

Yes, one year after project close but with clear attribution to the project.

#### **Decree on Minimum Service Standards implemented**

No<sup>88</sup>.

#### **New regulation on bus service contracts and procurement implemented**

Yes to overcome legal issues with early 'misprocurement.'

#### **Business plan adopted, management systems in place & operational**

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<sup>88</sup> MSS have been taken up in May 2014 through Gubernurial Regulation 35/2014 forcing TransJakarta operators to improve their services. The MSS cover security, safety, comfort, pricing, equality and reliability of TransJakarta buses and shelters. The MSS will be used by the city administration to determine the subsidy paid to TransJakarta. However, requiring standards while having a procurement system that always selects on lowest cost may be self-defeating. Refer para. 64.

No. There is only the Annual Forward Program of DisHub that combines Transjakarta, there are no obvious management systems in place for HR or monitoring of bus service quality.

#### **Restructuring completed**

No, since BUMD was not formed by end of project although authorisation was given by parliament in December 2013. However, no practical steps towards staffing or capacity development have been taken at time of the TE. Experience shows this will take two or three years at a minimum.

#### **Funding mechanism established**

No, comprehensive adequate multi-year budget mechanism established. Refer above on ability to retain fare revenue.

#### Details for Output A.2b

##### **A.2.b Advice on support for establishment of Transjakarta provided**

##### **Academic paper on business plan prepared**

Yes, completed by 30 April 2011.

##### **Advice on restructuring provided**

Yes, restructuring team was established by 31 Dec 2010.

##### **Advice on position descriptions, training and staff capability provided**

70% complete by 31 May 2011.

##### **New regulation on bus service contracts and procurement implemented**

Yes, draft completed 30 September 2010.

#### Details for Direct Outcome A.3a

##### **A.3.a Intersection conflicts reduced along BRT corridors (Rating 2, summary: little attempt at shortening signal cycle times to reduce delays has been attempted although new ITS centre may offer potential).**

##### **Intersections improved along BRT corridors**

End of project operating speed was 20kph on average compared to baseline of 19kph (refer PIR for year ending Dec. 2012) however this baseline level is lower than the 20kph reported in the PIR for FY08. Note also that according to surveys done by consultants SDG in November 2010 for the feeder bus study corridor bus speeds varied greatly as follows: corridor 1 (14.2kph); corridor 2 (14.8kph); corridor 3 (21.4kph); corridor 4 (14.2kph); corridor 5 (15.4kph); corridor 6 (14.9kph); corridor 7 (15.5kph); and corridor 8 (24.5kph). These data indicate generally lower speeds than PIR reporting shows. Three intersections along corridors 1, 6 and 10 were improved by September 2011 with a 30% reduction in delays. However, initial baseline surveys and improvement proposals were completed in 2007 for all major junctions on completed corridors. No other improvements were implemented.

##### **Bus lanes illegal use enforced along corridors**

Yes although the low fines per violation encouraged illegal use (Rp. 50,000 per violation). In November 2013, likely as a result of project influence and other factors, fines were increased to Rp 500,000/ violation with reportedly significant compliance.

## Details for Output A.3a

### **A.3.a Advice on reducing conflicts, enforcing illegal use provided**

Baseline measurements undertaken at intersections. Yes, completed within first 6 months of the project.

#### **Improvement proposals prepared**

Improvement proposals were prepared in April 08 by Pedro Szasz and planning for improvements made. In December 08, Pedro Szasz reviewed operational problems including the effect of operating very long cycle times – 4 to 7 minutes or 50% to 100% longer than optimum. He recommended shorter cycles that would reduce delays to buses by 40% and the TE observes they would also benefit general traffic. The proposals were not implemented & by June 09 the project intended to work with the city to use traffic signal priority using the Area Traffic Control (ATC) system. Later there were proposals to build an underpass at one junction. The TE review notes that due to high peak traffic flows in peak period, dynamic intervention with ATC is unlikely to be useful in peak periods. With the new ITS Centre now implemented by DisHub (August 2011 and with special software by December 13 final completion) there should be improved opportunities for off-peak signal priority for buses. In any case, Szasz's recommendations for shorter cycles using the ATC should be implemented urgently.

#### **Actions to enhance on road enforcement**

Transjakarta from early stages had on staff a senior ex-policeman to liaise with police.

## Details for Direct Outcome A.3b

### **A.3.b. Adequate CNG supply is conveniently available (Rating 5, summary: access to CNG stations has greatly improved but losses in bus revenue-earning time of 2 hours/ day still exist).**

#### **Refuelling times are less than 20 minutes**

At project close with six CNG stations an hour is lost every time a bus leaves service to refuel and this occurs twice per day even though actual bus refuelling may be less than 20 minutes.

#### **Number of refuelling stations is increased**

Yes, six high speed CNG refuelling stations now available from 2 at beginning of project.

#### **Decree on price and supply of CNG implemented**

Yes, Ministerial Decrees No 2932 K/12/MEM/2010 on CNG price for the transport sector in Jakarta dated 15th of December 2010 which set the price at 3,100 rupiah per liter equivalent petrol (lsp) and No 19 year 2010 dated 13th of December 2010 on the allocation of natural gas for transport.

## Details for Output A.3b

### **A.3.b. Advice to improve CNG supply provided**

#### **Research paper on '2 CNG supply' prepared/ advocacy completed**

CNG research papers completed by December 10. CNG refueling was not identified as a problem in the project design. CNG supply was described as the main operational problem in ITDP's Progress Report of December 2009. It said the problem stems from DKI Policy in implementing local regulation 2/2005 which requires all public transport to use CNG. At December 2009, 6 CNG filling stations were operating but 4 were low pressure supply requiring low filling times and there were 2 private stations with high pressure equipment. But the latter 2 closed as they could not supply CNG

at the regulated price. Delays in accessing stations (all public) led to efficiency losses of 15% i.e. 3 hours/ day. At December 2013, with 6 high pressure stations operating conditions are better but losses of 2 hours per day per bus are still estimated (by Indll consultants).

Records of CNG consumption by BRT buses appeared to overestimate CNG quantity used by buses by 20% or more as reported by the PIR of 2009. It was suggested in the PIR that the government meters may be in error although the subsequent project focus was on the actual efficiency of CNG consumption by buses. The same issue was reported in PIRs of 2010 and 2011 but not in 2012. However, the problem appeared to have persisted to the end of the project with the final calculation of GHG emissions per bus-km using for example by 12m rigid CNG buses estimated by the project team to be 15% higher than for the equivalent 12m diesel bus in BRT service based on actual fuel consumption records. It would have anticipated that GHG emissions per bus-km should be 10-15% lower for CNG compared to diesel rather than 15% higher in line with the project's expectations. The project commissioned a report by Indonesian experts on CNG quality that found that the CNG being retailed for transport had a lot of impurities and a high moisture content but met Indonesian quality standards. Bus operators claimed that high CNG consumption was due to high congestion in mixed traffic sections or when approaching bus stations, peak period overloading and poor CNG quality. Information supplied by an expert on CNG buses and BRT<sup>89</sup> indicates that the operators claims may have a basis but are not sufficient to explain the 30% difference between actual and expected efficiency of CNG consumption. The expert considers that, to the extent that records of official CNG consumption by buses are correct, that a key problem may be that the CNG engines are incorrectly calibrated for the drive cycle. The project team put a lot of effort into understanding the issues but doubts about the government meters and the inability to verify their measurements, thwarted their efforts for a clearer understanding of the issue.

#### Details for Direct Outcome A.4

**A.4 BRT services optimised (Rating 2, summary: services are poorly managed by bus operators and Transjakarta does not show any obvious signs of trying to rectify the situation. The result is irregular crowded buses with long waiting times for pax. Bus control centre has not been implemented as planned).**

##### **Bus control centre is implemented and functional with appropriate software and hardware**

No, as original intention was the creation of a bus control centre for Transjakarta by end 2011 that is now programmed for FY2014. However, after 2010 a new traffic control or Intelligent Transport Systems Centre was reported on. This was implemented at DisHub by August 2011 but necessary software was not provided. Software was installed in FY 2013 and system integration was still underway during the TE in December 2013. The centre can monitor bus operations along BRT corridors 4 to 6 only. But there is no protocol for Transjakarta to use the centre to optimise bus operations or for ITS operators to intervene to give priority to buses. The issue is institutional.

##### **Capable staff operate control centre**

There are no staff from Transjakarta involved from bus operations side. In fact, Transjakarta propose to build their own bus operations centre in FY 14 at their own offices.

##### **Communications link with buses established**

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<sup>89</sup> Personal communication with John Rogers of World Bank on February 3, 2014 who developed the CNG methodology for the Mexico City Metrobus and was closely involved with Metrobus and its CNG operations from the outset.

No. There appears to be no driver to control centre or driver to Transjakarta communications.

**MoU with police on enforcement protocol established**

No. There is no formal agreement on enforcement but police appear to cooperate.

Details for Output A.4

**A.4 Bus system operational advice provided**

**ToR for control system requirements prepared**

ToR prepared by November 2010.

**Singapore LTA Academy report on bus control system prepared**

Training provided by LTA Academy on bus control training, and report on control room prepared, by December 2010.

Details for Direct Outcome B.5

**B.5 Information/awareness on BRT and other public transport is enhanced (Rating 3, summary: static pax. information exists. BRT stations are visible. BRT routes are comprehensible to the public. But the quality of information is deteriorating with little attempt shown by Transjakarta to maintain a common signature).**

**Transjakarta implements/ improves communications with pax/ via SMS internet**

Transjakarta has a web site but it is passive – there is no journey planner. Customer complaints can be SMS'd in. Call centre staffed by up to 7 staff and they will provide verbal assistance to customers.

**TransJakarta creates a PR position and fills it**

There was a PR person in place since the commencement of the project.

**Adequate budget provided for PR etc. activities**

There is no written forward work plan that is determined by an assessment of needs provided each year. Instead the budget is largely determined by current programs – such as passenger satisfaction surveys etc., maintenance of the web site and payments to call centre staff.

Details for Output B.5

**B.5 Advice on improving PT information/ public awareness provided**

**Media study training prepared**

ToR prepared by November 2010.

**Annual focus groups and survey of pax. /non-pax completed**

Pax. satisfaction including 'former mode' surveys done annually (approx. 2,400 users and 600 non-users).

**Training on PR education and route information in Jakarta, other cities provided**

Yes, by January 2011 for corridors 9 and 10 for Transjakarta and by May 2010 for Pekanbaru.

**Annual training for TransJakarta, NGOs, others provided**

Yes, various training completed over project.

## Details for Direct Outcome B.6

**B.6 Feeder services to BRT operated in all corridors (Rating 3, summary: Bus services that existed before BRT were not completely withdrawn due to the project's efforts. New direct feeder services were introduced but not according to the recommendations of ITDP).**

### **Bus feeder services implemented according to action plan**

No, the concept of direct services to integrate Transjakarta BRT with non-BRT buses were not accepted by government and bus operators. Feeder Bus Action plan that recommended five feeder bus areas was prepared in 2011. The concept included feeder buses operating using Transjakarta contracts on a per-km basis and standard fares. As implemented, in January 2013, two feeder routes were operated by Kopaja using normal on road operational methods (i.e. licence to operate with cost recovery funded solely by fares), a fare of Rp 5,000 per pax. trip, and buses that do not appear as part of Transjakarta system with routes that are poorly advertised. However, ordinary bus services were not withdrawn from BRT corridors allowing 57% of BRT passengers to access BRT by other bus at end-of-project, higher than the target of 50%.

### **Transjakarta staff have capacity in bus feeder design, procurement and operations**

No. Routes and services are procured by DisHub's normal public transport licensing unit. DisHub made decision not to proceed with feeder buses as proposed by project.

### **Adequate budget is provided to support feeder bus**

None provided as none needed for system as operated although it is noted that Transjakarta collects fares for Kopaja for no reimbursement.

### **Legal base for feeder services sound**

Nil.

## Details for Output B.6

### **B.6 Advice on feeder bus routes to BRT provided**

#### **Transport model updated and applied for bus feeder design**

Substantially. Model updated by February 2011 and supplemented by existing pax. OD and count data that was adequate for underpinning feeder bus recommendations.

#### **Bus feeder action plan and business plan prepared**

Completed by June 2011.

#### **Training to Transjakarta provided on feeder services**

Training provided by February 2011.

## Details for Direct Outcome B.7

**B.7 Travel demand management is implemented (Rating 4, summary: parking legislation was prepared and partially implemented. National legal authority for road pricing was established but local enabling legislation has yet to be promulgated).**

### **Road pricing scheme implemented**

No<sup>90</sup>.

### **Legal basis for road pricing and taxation implemented**

Provision is made in the national Road Traffic and Transport Law [22/2009] but related provisions were dropped from the Law on Regional Taxes and Fees [28/2009] which was enacted just a few months later. Government Regulation (97/2012) was issued in October 2012 which added a Road Traffic Fee (Retribusi Pengendalian Lalu Lintas) to the list of Retribusi contained in Law 29/2009. This also specifies criteria and conditions for its application. Points to note are:

- It does not apply to motorcycles;
- It only applies to dual carriageway roads with at least two lanes in each direction and which are served by mass public transport services meeting minimum standards defined by Minister for Transport (not sure if these have been issued);
- It only applies for periods when volume: capacity ratio > 0.9 and average travel speed is ≤ 10kmph on every working day;
- The Minister for Transport determines if criteria are met and is empowered to approve proposals from regional governments;
- The proceeds to be used for improving traffic flow and /or public transport; and
- DKI Jakarta still need to approve a relevant local regulation for road pricing implementation.

### **Parking measures implemented**

Off street parking regulation to cap the no. of spaces in developments passed in September 2012. The regulation to increase on street parking charges, encourage space turnover and modernize the method of fee collection had not been implemented at time of the TE.

Details for Output B.7

### **B.7 Travel demand management measures evaluated**

#### **Road pricing strategy prepared**

Off street parking regulation to cap the no. of spaces in developments passed in September 2012. The regulation to encourage space turnover and modernise the method of fee collection had not been implemented at time of the TE.

#### **Parking strategy and tariff regulation prepared**

Completed by January 2011. Used as a basis for parking regulations. Regulation on tariff increases implemented March 2012.

#### **Strategy and draft regulations for road pricing etc. prepared**

Yes by December 2010 and December 2011 respectively.

#### **Study tours/ public discussions completed**

Yes by May 2011.

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<sup>90</sup> A major Electronic Road Pricing trial was announced in May 2014 to be started in July 2014.

## Details for Direct Outcome B.8

**B.8 Pedestrian/NMT facilities improved in Jakarta/ other city (Rating 4, summary: a good attempt at improving pedestrian access to BRT stations in Jakarta was made with the project's assistance. But prevailing physical constraints limited the impact. Some attempts at improving pedestrian facilities in Pekanbaru and other cities was made).**

### **Pedestrian improvements implemented within 200m of BRT stations**

Landscaping and pedestrian treatments attempted to be implemented at all stations but physical constraints were difficult to overcome. Not accessible by persons with disabilities. Site inspections at 20 stations during TE show maintenance is poor. Notable success includes Plaza Fatahillah but this plaza is not physically adjoining the bus station. Pedestrian bridge and escalators built by private developers at S. Parman Podomoro City station on Corridor 9 and at station Salemba Carolus on Corridor 5.

### **Secure bike parking provided at 4 BRT stations**

No bicycle parking provided at BRT stations by Transjakarta/ DisHub. But many developments near BRT stations provide bicycle parking that may be used for BRT access. However, surveys of 3,200 users in November 2010 showed only 0.6% used bicycles for access to BRT stations in part because no facilities were provided.

### **Pedestrian improvements implemented along Corridor 1 and at Plaza Fatahillah**

Closure of a small road at Plaza Fatahila in historic part of city in 2007 that remains a popular walking and market street especially on weekends. It is located approximately 100 meters to north of the BRT station. 5km of pedestrian improvements implemented between Harmoni and Kota stations in 2012.

### **North Jakarta bike lane operating**

17km bike lane remains operating at the canal frontage location – enforcement issue – motorcycles intrude.

### **NMT facilities in Pekanbaru implemented**

None by project as project resources focused on improvements to BRT.

## Details for Output B.8

### **B.8 Advice on pedestrian and NMT improvements provided**

#### **Pedestrian facilities condition/movement survey completed**

Completed by 31 October 2010 along all existing BRT corridors in Jakarta.

#### **Training in pedestrian/NMT demand/ design completed in Jakarta and other city**

Completed by 31 October 2010 in Jakarta.

#### **Design plans prepared for pedestrian and NMT facilities**

Plans prepared for 5km along Corridor 1 between Harmoni and Kota stations.

#### **Awareness campaign on pedestrian/ walkability completed**

Completed by June 2011.

## Details for Direct Outcome B.9

### **B.9 Outreach and dissemination activities result in local commitment to implement BRT/ NMT in one city (Rating 5, summary: outreach to Pekanbaru was fairly successful with a second BRT corridor implemented with project support).**

Project provided outreach and assisted the City of Pekanbaru to convert their special BRT Unit under the governor to a BLU under DisHub. A second BRT corridor was added while the ITDP team worked with the city (mid 2011). A third corridor was subsequently established. No major NMT facilities were established. By end FY2012, Pekanbaru city provided Rp 17 Billion from the local budget (APBD) to improve TransMetro BRT. Due to the influence of TransJakarta dating back to 2004, a form of BRT is now established in 13 Indonesian regional cities, including Yogyakarta, Solo, Palembang, Pekanbaru (project city) though with different performance when it comes to ridership and cost-recovery. The form of BRT is sometimes known as 'quality bus' as corridors are shared with traffic but stops are spaced further apart than on-street services. Bus stops/ stations may be located at the centre or the side of roads. NMT facilities vary by city. (Note: Project Document referred incorrectly to 2 cities in some places - budget actually provided was for one city).

## Details for Output B.9

### **B.9 Outreach/ dissemination activities in at least 1 city completed**

#### **Plans for BRT, pedestrian zone, NMT prepared**

NMT focused on station access, bicycle and Transmetro promotion completed by April 2011.

#### **Training courses delivered**

Management training course completed February 2010.

#### **Business model, revised contracts, institutional strengthening plans prepared**

Completed by March 2010.

## Annex 7: TE Surveys on BRT TransJakarta Performance

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### A7.1 Introduction

Transjakarta is a Bus Rapid Transit Transportation system operating since year 2004 in Jakarta capital city, Indonesia. Until now Transjakarta has been operating 12 BRT corridors and has the length which often stated as the longest BRT lanes in the world.

Transjakarta BRT system is implemented with the aim to provide better public transport to the people of Jakarta with a Mass Rapid Transportation System which is fast, comfortable and reliable., It is expected that private vehicle users is attracted to switch their mode of travel to BRT Transjakarta. By that it will somehow reduce traffic congestion, fuel consumption and GHGs emission.

After about nine years of operation, the achievement of Transjakarta is a matter that needs to be evaluated. How good the services and how effective Transjakarta influence modal choice, alleviate environmental impact, integrate with other transportation mode are matters which needs to be continuously monitored in order to achieve its ultimate goal on reducing the GHGs emissions. Therefore, this survey is conducted to evaluate the performance and impact caused by the presence of Transjakarta. This study is expected to be able to explain the extent of Transjakarta achievement so far, so it can be used as lesson learnt and improvement consideration by Transjakarta operators and other BRT-like system elsewhere.

### A7.2 Survey Methodology

Surveys regarding Transjakarta performance had been conducted in several past studies. The prime focus of the recent survey is to identify how effective Transjakarta influencing peoples in choosing their mode of travel, in particular the choice riders, and the related behavior of choice riders towards private vehicle use. Other issues of concerns are decision of users on preferred mode of transport suppose the BRT Transjakarta does not exist. Also issue on transjakarta integration with other modes and user satisfaction is posed to the respondents. Respondents are all Transjakarta frequent riders.

The survey form consists of several questions, that is:

1. Gender
2. Age
3. Income
4. Trip Origin and Destination
5. Preferred transportation mode if Transjakarta does not exist
6. Ownership and usage of private vehicle
7. Reason using BRT and circumstances which affect
8. Transportation Mode to reach BRT shelter and last destination
9. BRT user willingnes to pay
10. Transjakarta BRT level of service

See attached Appendix for the questionnaire sheet at the end of this Annex.

The survey comprises a series of piloting and the main survey, as detailed in the followings.

### A7.2.1 Piloting survey

Piloting or can be referred as experiment survey which is conducted prior to the main survey, with an objective to identify the problems, obstacles and challenges which will be encountered in the field during the main survey. The pilot survey was conducted two times i.e. on Wednesday, January 29 and Thursday, January 30, 2014. The piloting were conducted in the following BRT stations:

1. Harmoni Central Busway
2. Blok M

An amount of 50 respondents were interviewed in each piloting. Results from the piloting lead to a revision of some questions and suggestion for a better way to deliver the questions to respondents in plain and clear Bahasa Indonesia also consideration for better execution of the main survey both in terms of form filling and other technical aspect and coordination amongst surveyor. This is particularly related to achieving the sampling target distribution as revealed from previous SDG studies. i.e. gender and age distribution target.

### A7.2.2 The Main Survey

The Main survey was conducted on work days from Monday, 3th February 2014 to Monday, 10th February 2014 excluding weekends, effectively six days in total. The surveys targeted to obtain respondent distribution by gender approximately 50:50 and by age as seen below, all of which revealed from the previous studies, see Annex 8.

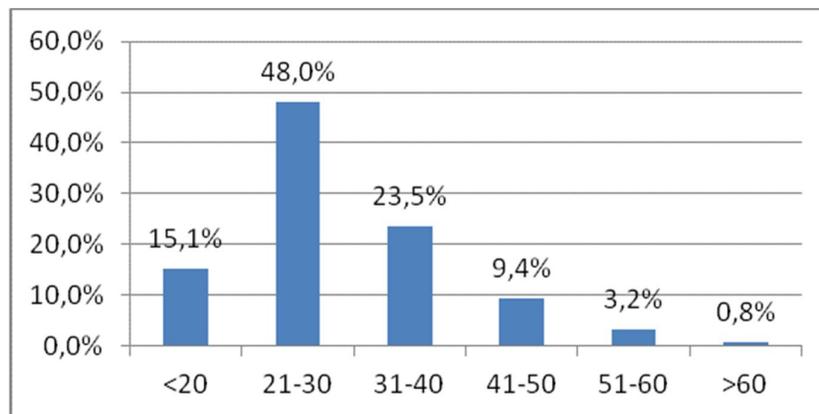


Figure A7. 1 Targeted Age Distribution

The survey was conducted in 11 busiest shelters and interchanges as listed below:

1. Harmoni Central Station
2. Kota
3. Pluit
4. Grogol 1
5. Dukuh Atas 1
6. Blok M
7. Senen Central Station
8. Matraman
9. Kuningan Timur
10. Ragunan
11. Cawang/UKI

The location of those shelters cover almost long trip form north to south and busiest stations in the city center, see Transjakarta map in Figure A7.2, survey locations are marked by red circles.

### A7.3 Results

As described earlier, the survey series consist of two parts, namely the piloting and the main survey. Therefore the discussion of the survey series will be divided base on those categories.

#### A7.3.1 Piloting

Field problems which were identified during the pilot survey are as follows:

1. Permission from the BRT operator
2. Lack of surveyor understanding regarding filling procedure of the questionnaire or survey form
3. Several words and statements in the original questionnaire are rather difficult to be understood by respondents and surveyor.
4. Several mistakes in form filling
5. Difficulties in interviewing respondent who was in a hurry or was waiting for the next

As a follow up to resolve the problems a briefing was conducted on the February 1, 2014 at Gambir Station. The result of the briefing are as follows:

1. Coordination with every shelter officer or supervisor whose shelter will be surveyed will be done prior to the main survey. The intention is to avoid permission problem during the main survey.
2. Discussion to assure and improve surveyor understanding about the content of the questionnaire.
3. Changes in some words in survey form in order to make it easier to understand
4. Addition of supplementary points and useful questions
5. Experience sharing about condition that will be encountered on the field and how to tackle them.

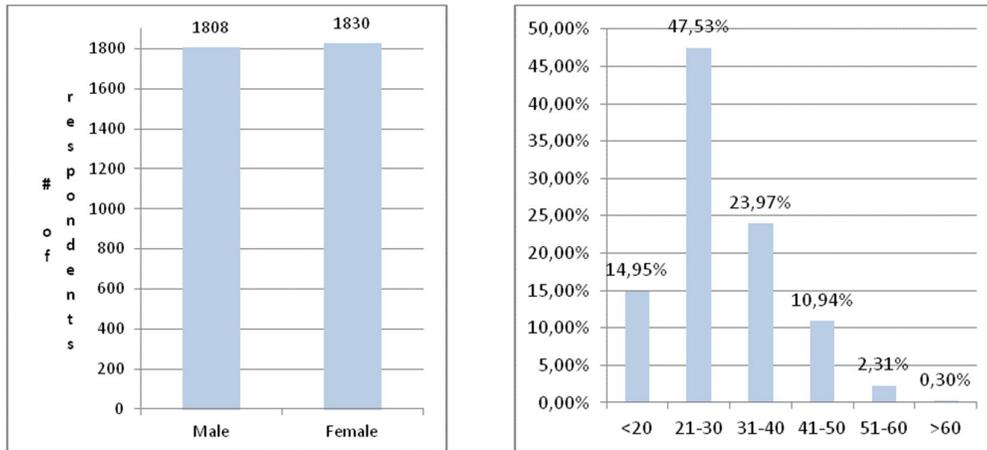
#### A7.3.2 The Main Survey

The number of questionnaire filled and collected in the main survey are 4016 sheets. However, because of mistakes and inconsistency in filling the form and incomplete sheets, some questionnaires must be excluded in data processing stage. Finally an amount of 3638 cleaned questionnaires are utilized for further analysis. This is considered to be sufficient as representing 10% of daily Transjakarta users. The findings are summarized in the followings.



## A. Gender and Age

Gender and age distribution of respondents can be seen in Figure A7.3. It shows that the gender distribution of the respondents is almost 50:50, i.e. 1808 male or around 49.7% out of total respondents and female 1830 or 50.3%. This is approximately similar to the previous survey conducted by Steer Davies and Gleave in 2011 that that greater resources for sampling control (refer Annex 8).



**Figure. A7.3 Gender and Age Distribution**

Adjustment to achieve the target distribution is made by pre-processing the data day-by-day, which then it may suggest to look for or select a particular category of respondent in order to fit the gender and age distribution. On gender it is rather easy as the target is almost 50:50, fortunately we can achieve the age distribution target too at the end.

## B. Income

The respondents' income distribution can be seen in Figure A7.4. It can be seen that the majority of users Transjakarta have monthly incomes between 1 million to 5 million rupiah (US \$100 to \$500) and then followed by the user with an income below 1 million rupiah and then users with income between 5 million to 7 million rupiah.

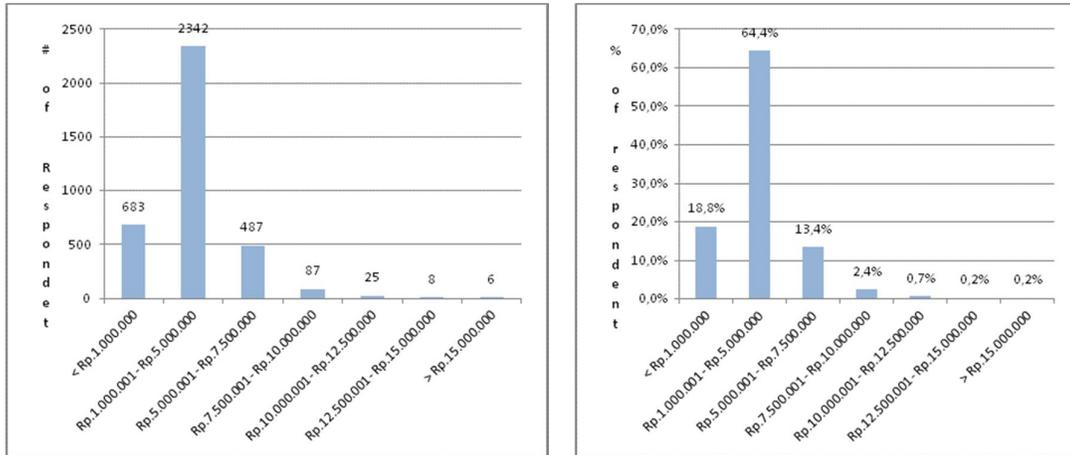


Figure A7.4 Income Distribution

**C. Preferred transportation mode if Transjakarta does not exist**

In the survey, supposed BRT Transjakarta does not exist, the respondents were also asked about what mode they would have chosen for their particular trip on that day. The result can be seen in Figure A7.5.

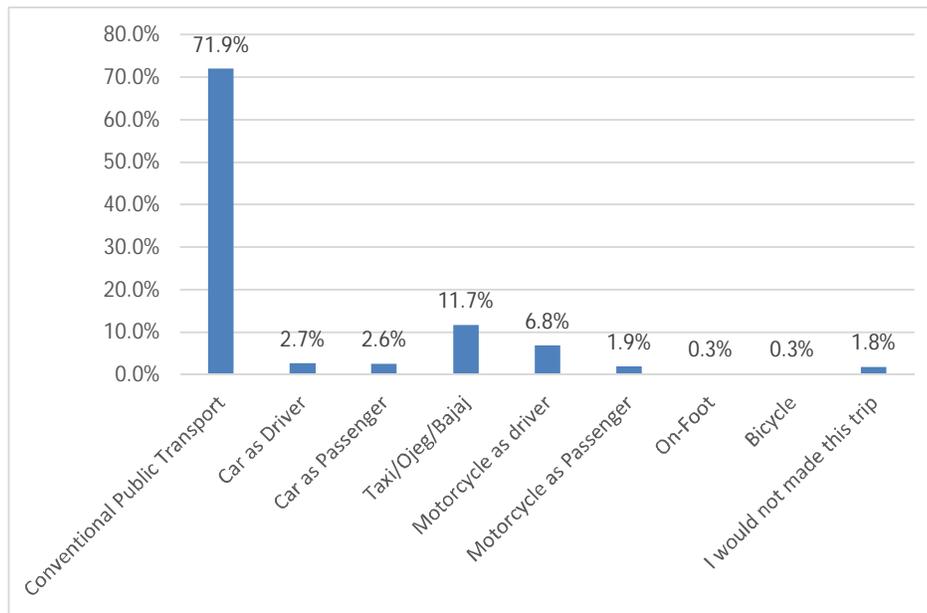


Figure A7.5 Mode Choice If BRT Transjakarta Does Not Exist

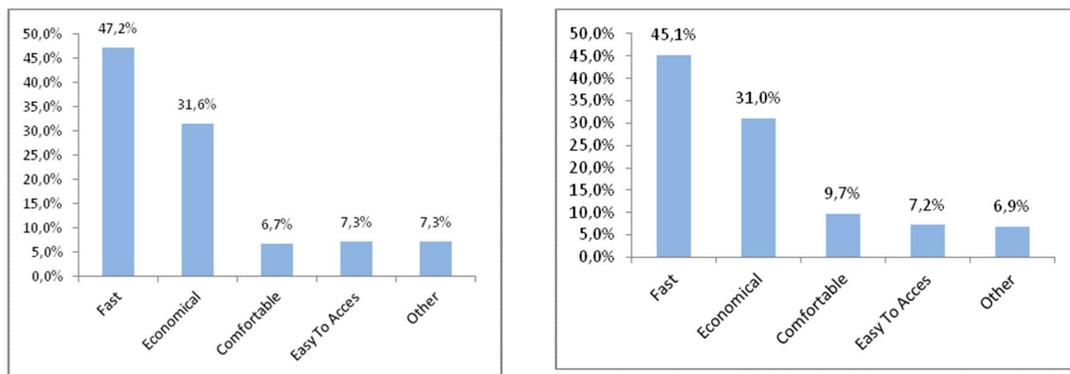
It can be seen that without BRT the percentages of alternative use of modes would have been: (i) 71.9% ordinary bus;<sup>91</sup> (ii) 2.7% car driver; (iii) 2.6% car passenger; (iv) 11.7% taxi/ojek/bajaj; (v) 6.8% motorcycle driver; (vi) 1.9% motorcycle passenger; (vii) 0.3% walk; (viii) 0.3% bicycle; and (ix) 1.8% of trips would not have been made.

#### D. Behaviour of the choice riders

Moreover, respondents who choose to make a trip by private vehicles when Transjakarta does not exist be it motorcyclists and or car users were grouped as either drivers or passengers. These respondents are normally categorized as choice riders, although they own private vehicles they opt to ride the BRT Transjakarta. It was found that the distribution on this almost flat for car driver and car passenger and three-quarter to a quarter i.e. 3/4 : 1/4 for motorcycle drivers and passenger, respectively.

For car and motorcycle drivers in particular a further question was posed about a number of vehicle they own i.e. either one or more than one vehicle. It was found that half of car and motorcycle drivers own vehicles more than one. This can be interpreted that for car and motorcycle drivers who own only one vehicle, since their vehicles were left at home while they make a trip using BRT Transjakarta, it is most likely that other member of the family use the vehicles they left for other purposes or activities. These findings suggest that although mode switching from private vehicles to BRT Transjakarta do occur, this does not always save fuel consumption and reduce emissions, especially when the member of the family share and use the vehicle which is left by another member of the family.

Other choice riders behaviour regarding reasons for choosing BRT as compared to cars and to motorcycles are examined for these particular respondents. Figure A7.6 shows the reasons they opted to ride BRT both for car and motorcycle owners. As can be seen in general both car users and motorcyclists have a typical reason in choosing BRT, mainly it is due to the reasons faster and more economical, and other minority said it is more comfortable and easier to access.



**Figure A7.6 Reasons for choosing Transjakarta compared to car and to motorcycle**

<sup>91</sup> Surveys undertaken by TransJakarta show that from year to year about 70% of surveyed BRT users stated that ordinary bus was the alternative mode. However, data from ITDP's GHG emission reduction calculations report the following surveyed alternative modes in 2012: 24.9% motorcycle; 10.3% car; 5.3% taxi; 43.9% bus; and 15.6% other.

Moreover, when the choice riders respondents were posed a question under what condition they will get back and use their private vehicle, the responses vary depending on the circumstances. Most motorcyclists will get back using their motorcycle, if they are in a rush, followed by when they go out with family or friends, or at bad weather. While for car users the circumstance to get back using car mostly if they would like to go out with family and friends, then followed by conditions of bad weather or in a rush, see Figure A7.7.

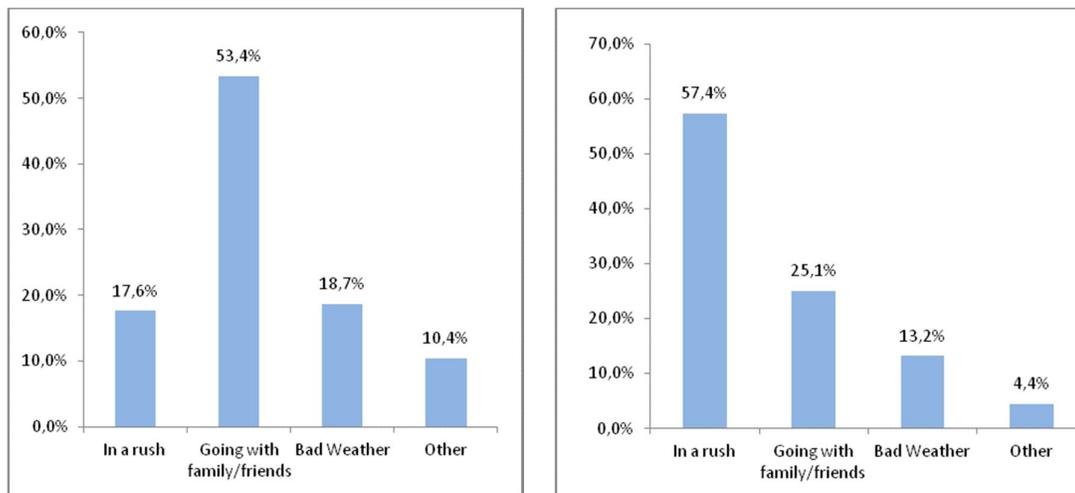
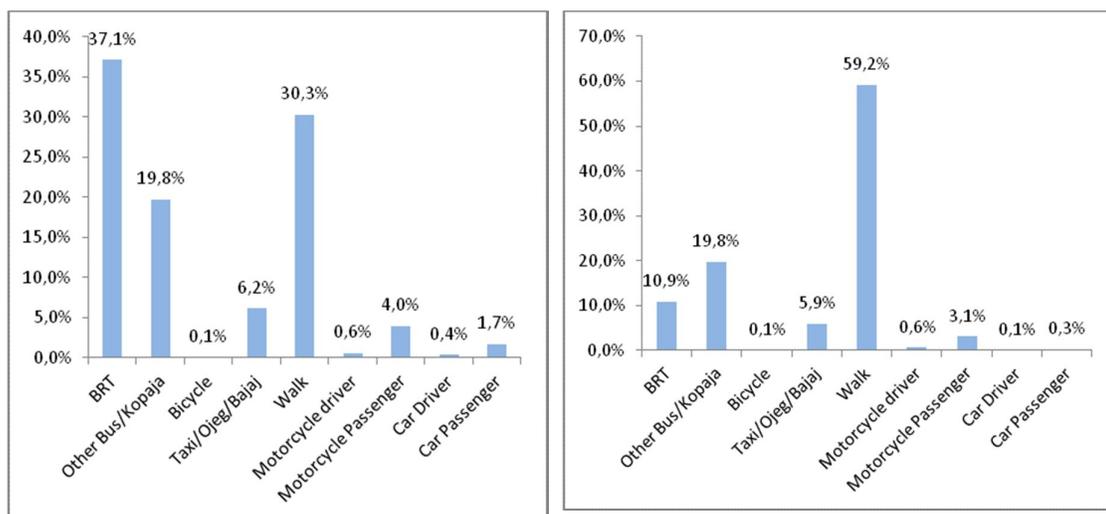


Figure A7.7 Conditions when private vehicle users avoid to choose BRT Transjakarta

**E. Access and Egress Modes to reach the BRT shelter and last destination**

This section will explain how respondents reached Transjakarta bus shelter when they were interviewed, also how they reach their last destination from the BRT shelter. Figure A7.8 shows the results from the survey. Access mode dominated by BRT and walk, then followed by other bus or Kopaja, then taxi and motorcycle. As for egress mode it was dominated by walk, then bus or Kopaja. For both access and egress modes, there a few BRT users were taken or picked by private vehicles as passengers either by car and or motorcycle, and even less as drivers her/him self. These drivers are categorized that they are using a park and ride facilities together with the cyclists, although they altogether are only minority.



### Figure A7.8 Access and Egress Modes

#### F. Tariff Issue: BRT users willingness to pay

This section will explain the passenger willingness to pay for Transjakarta tariff resulting from the survey. Figure A7.9 shows the distribution of willingness to pay that respondents answered during the survey.

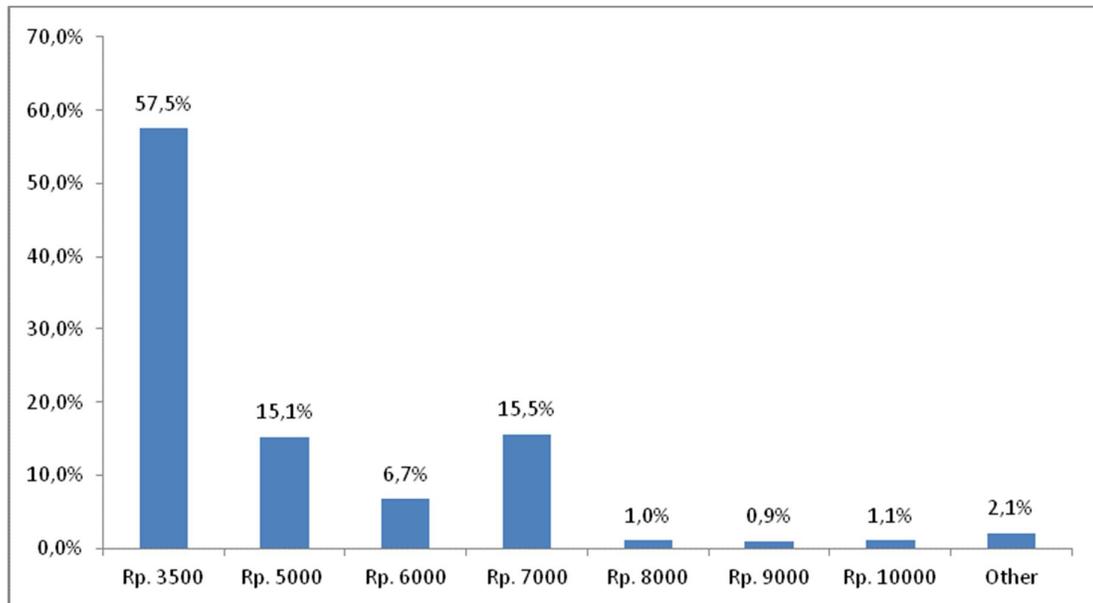


Figure A7.9 Respondent Willingness to Pay

It was found that most respondents or as many as 57.5% stated that the maximum tariff not to exceed Rp.3500, this is the current tariff apply in BRT Jakarta, followed by 15% willing to pay up to Rp 5000 and 7000, while 6.7% for up to Rp 6000. Only minority willing to pay above Rp 7000.

#### G. Transjakarta BRT Users's satisfaction

This section will describe opinion and experience of BRT Transjakarta riders from various aspects of satisfaction such as service, tariff, security, speed, etc. The service level perceived by respondents is shown in Figure A7.10. As can be seen overall satisfaction, majority around 80% are adequate and satisfied, while the rest are unsatisfied, with only minority very satisfied. Other aspects noted that waiting time is badly perceived as majority of the respondents experience a long and very long and moderate waiting time. Level of comfort is rather balance i.e. almost symmetrically distributed. In terms of tariff, security and speed aspects, they are perceived quite acceptable.

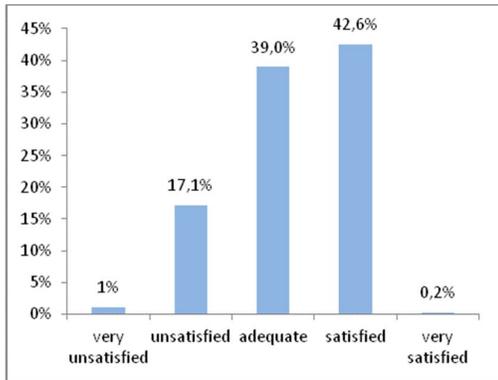
#### A7.4 Conclusion

The conclusion from the survey with regards to modal shift aspect, modal integration and level of service may be summarized as follows.

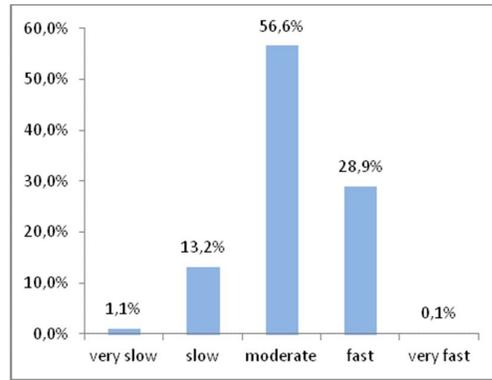
##### Modal shift

From the survey and from the trend resulting from data processing, it can be concluded that the presence of Transjakarta BRT does not significantly alleviate the traffic congestion, hence does not reduce fuel consumption and GHGs emission significantly. This is shown that most of Transjakarta busway passengers are former conventional public transport user. Although there are some Transjakarta passenger used to be private vehicle users, the majority of them owns a

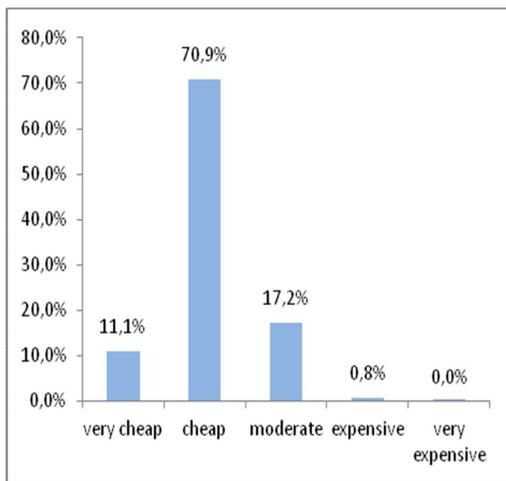
private vehicle and some have more than one private vehicles which also used by other family member when the respondents are riding Transjakarta.



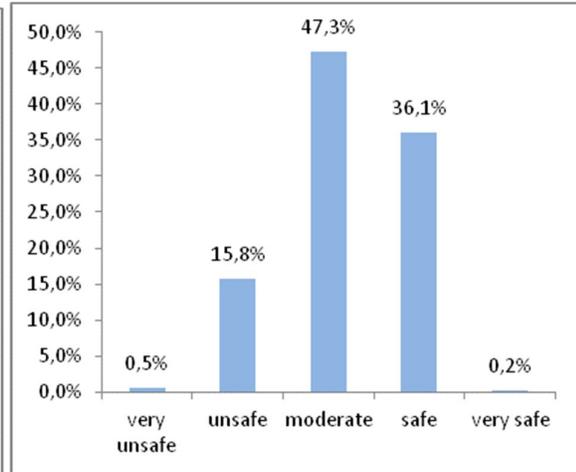
Overall satisfaction



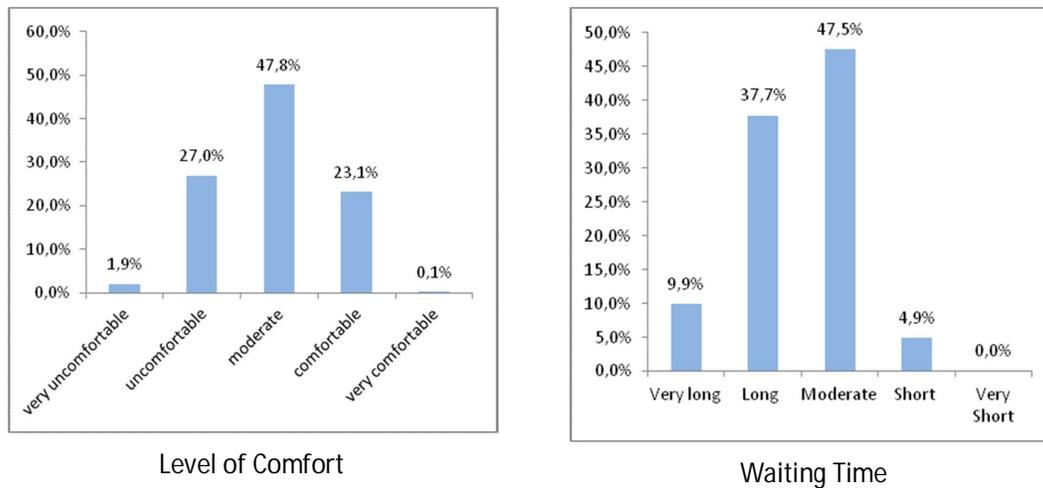
Travel Speed



Tariff



Level of Security



**Figure A 7. 10 Respondent satisfaction of Transjakarta Service**

The results from data processing also shows that the majority of passengers will get back to the private vehicle when they are in a hurry, go with family or friends and in bad weather condition.

It can also concluded that the reason why many respondent prefer to use Transjakarta compared to car or motorcycle is because according to the respondent, using Transjakarta is more economical and fast as compared to using private vehicles. This is an aspect which must be preserved in order to keep the people keep riding Transjakarta, so it can attract more people to shift from private transport mode to BRT Transjakarta.

Finally, it is worth noting that we found it rather difficult to correlate the past studies results with the current studies, particularly the aspect of mode shifting profile. This is particularly true as previous time series data on mode shifting is not complete over time. However, from best readily data it can be said that choice riders who opt to ride BRT are still well below 10% for private cars and in average 15% for motorcycle. In this survey we found that 8.7% respondents of motorcycle users and private car users only 5.3% who opt to ride the BRT Transjakarta, as these respondents said the will get back to their previous private mode either car or motorcycle if Transjakarta does not exist.

### **Tariff**

As found in the survey the majority of respondents' willingness to pay for Transjakarta ticket is up to Rp.3500, which is the same as current tariff setting, only few afford Rp 5000 up to Rp 7000.

### **Modal Integration**

It can be inferred from the survey that BRT Transjakarta is integrated with some other public transport mode especially other buses and Kopaja. There are many people walks to the shelter and there are only a few using bicycles and other minority are dropped by private vehicles. Facilities for NMT also park and ride urgently need improvement to enhance users' convenience to reach BRT shelters. From the survey it was found that BRT transjakarta still not have good park and ride facilities.

### **Users' Satisfaction**

From the data processing, it can be inferred that in general the satisfaction of Transjakarta users is moderate. However, bus waiting time noted very badly by the respondents.

In terms of user satisfaction past surveys such as conducted by YLKI rated satisfaction in relation to certain element of operational performance such as officer conduct, operation, infrastructure,

vehicle, drivers, etc. It was found that only operational aspect was good, while the remaining aspects are either poor or very poor. In this survey we focus more specifically on attributes of travel such as speed, waiting time, security, comfort, level of service. It was found as above mentioned that recently waiting time is getting worst in the performance of the BRT Transjakarta.

### BRT Transjakarta Questionnaire Survey

**Date** : \_\_\_\_\_ **Interviewer** : \_\_\_\_\_

**Time - hour** : \_\_\_\_\_ **Location** : \_\_\_\_\_

**Shift** : \_\_\_\_\_

**Gender:**

Male  Female

**Age:**

<20  41 - 50  
 21 - 30  51 - 60  
 31 - 40  >60

**Income:**

< Rp.1.000.000  
 Rp 1.000.001 – Rp. 5.000.000  
 Rp 5.000.000 – Rp. 7.500.000  
 Rp 7.500.001 – Rp. 10.000.000  
 Rp 10.000.001 – Rp. 12.500.000  
 Rp 12.500.001 – Rp. 15.000.000  
 > Rp. 15.000.000

**Section A:**

Please advise your origin and destination for the trip

Origin Shelter : \_\_\_\_\_

Origin Corridor : \_\_\_\_\_

Destination Shelter : \_\_\_\_\_

Destination Corridor : \_\_\_\_\_

### Section B:

Assuming that BRT doesn't exist, what mode of transport would you have used for this specific trip you are doing currently? ( Choose one only)

Public Transport (Angkot, Bus, Minibus/Kopaja/Metromini)

Car as a driver (*if you choose this answer, please proceed to question C1 to C5*)

Car as a passenger (*if you choose this answer, please proceed to question C3, C4, C5*)

Taxi/Bajaj/Ojeg

Motorcycle as a driver (*if you choose this answer, please proceed to question D1 to D5*)

Motorcycle as a passenger (*if you choose this answer, please proceed to question D3, D4, D5*)

On Foot

Bicycle

I would not have made the trip

### Section C:

C1. Do you or your family own a car or do you have access to a car?

No  Yes

C2. If yes, how many cars do you own or have access to?

1  >1

C3. When using Transjakarta, is the car you own or you can access be used by your family member?

Yes  No

C4. What is your reasons for prefer to use Transjakarta Bus compared to use car ?  
(Respondent can give more than 1 answer)

Fast  Economical  Comfortable  Easy to  
access

Other (Please Specify)

.....  
 .....

C5. Under which circumstances are you still using car instead of Transjakarta Bus for the same trip destination? (*Respondent can give more than 1 answer*)

In a rush       Going with family/friends       Bad Weather

Other (Please Specify)

.....  
 .....

#### Section D:

D1. Do you or your family own a motorcycle or do you have access to a motorcycle?

No       Yes

D2. If yes, how many motorcycles do you own or have access to?

1       >1

D3. When using Transjakarta, is the motorcycle you own or you can access be used by your family member?

Yes       No

D4. What is your reason for prefer using Transjakarta Bus more than using motorcycle?

(*Respondent can give more than 1 answer*)

Fast       Economical       Comfortable       Easy to  
 acces

Other (Please Specify)

.....

.....  
 .....

D5. Under which circumstances are you still using motorcycle instead of Transjakarta Bus for the same trip destination? *(Respondent can give more than 1 answer)*

- In a rush       Going with family/friends       Bad Weather  
 Other (Please Specify)

.....  
 .....

### Section E:

E1. How did you access this Transjakarta station for this trip?

- BRT       Other bus/Kopaja       Cycle  
 Taxi/Ojeg/Bajaj       Walk  
 Motorcycle driver  
 Motorcycle passenger  
 Car Driver  
 Car Passenger

E2. How do you access your destination from the last Transjakarta Shelter for this trip?

- BRT       Other bus/Kopaja       Cycle  
 Taxi/Ojeg/Bajaj       Walk  
 Motorcycle driver  
 Motorcycle passenger  
 Car Driver  
 Car Passenger

**Section F:**

How much maximum money do you willing to pay for the Transjakarta's ticket today?

Rp. 3500

Rp. 5000

Rp. 6000

Rp. 7000

Rp. 8000

Rp. 9000

Rp. 10000

Other (please specify the number).....

**Section G:**

G.1 In general, are you, as a passenger, satisfied with the service of Transjakarta?

very unsatisfied

unsatisfied

adequate

satisfied

very satisfied

G.2 Please rate the following factor of services

No	List of Services					
1	Travel time speed	Very Slow	Slow	Moderate	Fast	Very Fast
		1	2	3	4	5
2	Ticket price	Very Cheap	Cheap	Moderate	Expensive	Very Expensive
		1	2	3	4	5
3	Level of security within the Transjakarta	Very Unsafe	Unsafe	Moderate	Safe	Very Safe
		1	2	3	4	5

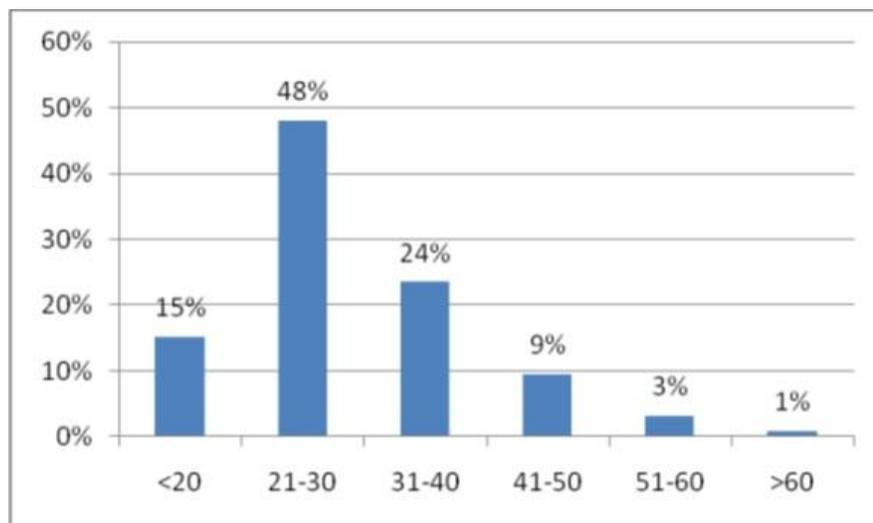
No	List of Services					
	system					
4	Level of comfort	Very Uncomfortable	Uncomfortable	Moderate	Comfortable	Very Comfortable
		1	2	3	4	5
5	Terminal waiting time	Very Long	Long	Moderate	Short	Very Short
		1	2	3	4	5

Thank You

## Annex 8: Classification of Transjakarta Passengers by Age and Gender 2010

Surveys were undertaken for the Feeder Bus Study in November 2010<sup>92</sup> from 6am to noon (and in some cases longer). Of the 3,395 completed surveys of interviewed passengers which was a random survey with good control over sampling rates, 50% of passengers were observed to be female and 50% male. Seventy two percent of passengers were aged between 21 and 40. Persons younger or equal to 20 years of age and those older than 40 years of age were observed to be under represented.

Age Band	Total Pax.		Distribution of Pax.		Total
	Male	Female	Male	Female	
<20	196	317	5.8%	9.3%	15.1%
21-30	794	835	23.4%	24.6%	48.0%
31-40	447	350	13.2%	10.3%	23.5%
41-50	189	129	5.6%	3.8%	9.4%
51-60	79	31	2.3%	0.9%	3.2%
>60	14	14	0.4%	0.4%	0.8%
Sub-total	1719	1676	50.6%	49.4%	100.0%
<b>Total</b>	<b>3395</b>		<b>100.0%</b>		



<sup>92</sup> Steer Davies and Gleave (2011), "Jakarta Feeder Bus Study: Base Year Transport Model Report." February.

## Annex 9: Assessment of GHG Reduction Estimates

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### A9.1 Introduction

As the project had the global environmental objective of reducing GHG emissions both by the project's interventions to support Transjakarta directly, and to influence transport policy in Jakarta and other regional cities, a key evaluation question identified by the ToR was "what was the global impact" of the project. The starting point to answer this question requires confirming whether the estimates of GHG reduction made by the project are credible.

As the time of project design in 2006 there was no precise methodology specified for verifying GHG reductions. ITDP's Terminal Evaluation Report (ITDP 2013), describes the methodology used by Pelangi Indonesia, an NGO working with ITDP, and ITDP from 2010, for estimating GHG reductions from 2004 to 2012 as:

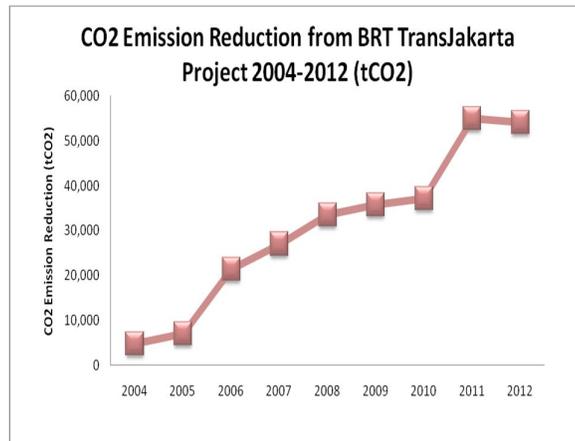
*"Measurements of energy consumption of the Transjakarta's buses under actual load and drive cycle conditions on the TransJakarta's corridors are multiplied by actual bus km per TransJakarta's records. The use of natural gas fuel for TransJakarta BRT was based on the national energy policy, since Indonesia has become importer of low quality oil fuel, thus natural gas intended to replace the use of oil as Indonesia still has some amount of natural gas preservation for domestic use, as well as reducing carbon footprint from world oil fuel distribution. A conservative analysis, using local estimates for private vehicle fuel consumption, and modal shift rate from private vehicle users to Transjakarta, shows the total emission reduction in period 2004-2011 from TransJakarta project is 275,758 tCO<sub>2</sub>. The shifting from the Private Motor Vehicle was not increase significantly, only 20% of passenger shift from motorcycle, 11% from private car, 3% from Taxi and most of the passengers 57% shift from conventional buses".*

Figure A9.1 shows the estimated cumulative emissions reduction from 2004 to 2006. The estimated GHG emission reduction in 2012 was 54,000 tonnes or 0.18 tonnes (reduced annually) per daily BRT passenger. This figure is consistent with experience of the Transmilenio BRT<sup>93</sup> and the Mexico City Metrobus BRT<sup>94</sup> that estimated that GHG emissions in the opening year would be 0.28 tonnes in 2006 and 0.2 tonnes in 2009 per daily BRT rider respectively. Hence, prima facie the GHG emission estimates appear in keeping with other relevant experience.

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<sup>93</sup>Grütter, J. 2005. The CDM in the Transport Sector, Module 5d of Sustainable Transport: A Sourcebook for Policy Makers. 2007. Prepared for GTZ. Eschborn. [[www.gtz.de/de/dokumente/en-cdm-transport-sector-2007.pdf](http://www.gtz.de/de/dokumente/en-cdm-transport-sector-2007.pdf)].

<sup>94</sup>Schipper et al. 2009. Considering Climate Change in Latin American and Caribbean Urban Transportation: Concepts, Applications, and Cases: Final Report, Prepared by Center for Global Metropolitan Studies, University of California, Berkeley, USA. [<http://metrostudies.berkeley.edu/pubs/reports/Shipper-ConsidClimateChange-LatinAmer.pdf>].

**Figure A9.1: Estimated GHG Emission Reductions**

Source: ITDP (2013).

In June 2010, Pelangi Indonesia did a review of the first approved CDM methodology that dealt with modal switch for BRT. This methodology known as AM0031 was developed for Bogota's Transmilenio BRT and was approved in 2006 by the United Nations Framework Convention on Climate Change. Pelangi concluded that they could estimate the direct changes in emissions due to change in fuel use of BRT buses, and use of cars, motorcycles, taxis and other ordinary buses due to a switch by the occupants of these vehicles, as they had done already for Transjakarta up to that time. They concluded they could not calculate the smoother flow of traffic following vehicle occupants switching to BRT, or the offsetting effect of rebound<sup>95</sup> as more trips are made in response to the freed road space, or other forms of leakage.

However, while ITDP (2012) say the analysis method was "conservative... using local estimates for private vehicle fuel consumption, and modal shift rate from private vehicle users to Transjakarta" as shown above a review of the calculation spreadsheets for 2004 to 2012 shows in fact they included in the total GHG reductions for each year the effect of estimated GHG reductions from other buses in addition to the savings in GHG from cars, motorcycles and taxis. The composition of the total estimated reductions in GHG in 2012 of 54,000 tonnes due to mode switch from car, motorcycle, taxi and bus that are offset by the GHG emissions from BRT itself are shown in Table A9.2.

**Table A9.1: Estimated GHG Emissions 2012 by ITDP**

Impact	Est. GHG tonnes	
<b>Increase due to BRT motive emissions</b>	<b>71,000</b>	
<b>Reduction due to Modal Switch</b>		
From car	24,000	19.2%

<sup>95</sup> Rebound was defined by the TransMilenio methodology as induced demand in an economic sense where "...if prices decline, consumption usually increases..." it also may include any sort of trip making that was formerly suppressed in the baseline but is able to be 'released' since traffic congestion is reduced due to the BRT.

Impact	Est. GHG tonnes	
From motorcycle	33,000	26.4%
From taxi	40,000	32.0%
From ordinary bus	28,000	22.4
<b>Sub-total reduction due to modal switch</b>	<b>125,000</b>	<b>100.0%</b>
<b>Net effect of Transjakarta</b>	<b>54,000 tonnes reduced</b>	

This same methodology was used from 2004 to 2012 to estimate GHG emissions by Pelangi and then ITDP (from 2010). The method encompasses the core approach of the TransMilenio methodology, the second CDM approved BRT/ rail mass transit methodology of 2009 applied to Mexico City's Metrobus, and the GEF endorsed methodology of 2010<sup>8</sup>, known as the Methodology for Transport Emissions Evaluation Model for Projects (TEEMP). TEEMP is less data-intensive than the CDM methods, and as for Pelangi and ITDP's method of estimation, does not consider the effect of changes in GHG emissions due to smoother traffic flow following mode switch or rebound and several other effects (refer attachment to this appendix). For example, GHG emissions due to BRT construction emissions were not estimated by Pelangi/ ITDP but they are typically assumed to represent less than one or two years of emission reductions.

Estimates of mode switch were provided by annual surveys carried out by Transjakarta/ DisHub. The basic question asked is understood to be similar to that used in the CDM methodologies "Assuming that the BRT you are currently using would not exist, how would you have made the same trip you are doing now?" Without qualification, this question has a number of limitations. Firstly, it assumes that the person made the trip, i.e. that there were no generated trips. But most importantly the range of alternative modal options did not distinguish drivers versus passenger, instead it only referred to car or motorcycle occupants. The 2012 calculations of GHG reduction of ITDP show the following surveyed alternative modes in 2012: 43.9% bus; 10.3% car; 5.3% taxi; 24.9% motorcycle; and 15.6% other. These results that show 40% would use a car or motorcycle as an alternative to BRT were reported in their PIR for December 2012. But in the same PIR, it is also stated "A survey showed that 7.1% and 15.4% of busway passengers used to drive private car and motorcycle respectively". That is, at 22.5% of BRT users said they would have used car or motorcycle or almost half of the other survey whose results they report and use in the GHG calculations.

Pelangi/ ITDP, and the two CDM methodologies, do not distinguish between the probable different propensity of drivers and passengers to switch to BRT. The approach taken by Pelangi/ITDP and the CDM/ TEEMP methodologies is to use the average observed vehicle occupancy, (taken by Pelangi/ ITDP to be 1.2 persons per vehicle for both cars and motorcycles including the driver), and to assume that both drivers and passengers respond in a similar manner. Sayeg and Bray (2012) show that this is likely to be an erroneous assumption and could lead to an overestimation in emission savings.

Surveys undertaken for the TE show the following responses to the question on alternative mode (in the absence of BRT): (i) 71.9% ordinary bus;<sup>96</sup> (ii) 2.7% car driver; (iii) 2.6% car passenger; (iv) 11.7% taxi/ojek/bajaj; (v) 6.8% motorcycle driver; (vi) 1.9% motorcycle passenger; (vii) 0.3% walk;

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<sup>96</sup> Surveys undertaken by Transjakarta show that from year to year about 70% of surveyed BRT users stated that ordinary bus was the alternative mode.

(viii) 0.3% bicycle; and (ix) 1.8% of trips would not have been made. These results differ from the proportions of car and motorcycle occupants and other alternative mode used by ITDP for the 2012 calculations. They show that car, motorcycle and taxi occupants would represent 5.3%, 8.7% and 11.7% of BRT users respectively. In contrast, the ITDP figures used in the GHG calculations showing 10.3%, 24.9% and 5.3% for car, motorcycle and taxi respectively. However, the TE surveys shows that bus as a former mode at 71.9% was more consistent with previous surveys and if this proportion was higher other modes would be represented to a lesser extent as likely indicated by the results of the other survey reported by ITDP. It appears likely that the most reasonable proportion of former car and motorcycle users to assume for future studies of GHG reduction would lie in the range 15% to 25%. This range is consistent with almost all of the surveys reported by ITDP in their PIRs from 2008 to 2012 and other experience.

There is another effect which is quite important and worthy of consideration in future surveys and analysis. The TE surveys what while motorcycle drivers were shown to switch more or less as assumed by the use of the average driver to total motorcycle occupant ratio. However, for cars which emit 10 times more GHG emissions per vehicle compared to motorcycles, the responses show that car occupants were drawn more or less equally drawn from drivers and passengers. This is quite different to that assumed by the use of average driver to total motorcycle occupant ratio (indicates 83% of car occupants that would switch would be car drivers). Further, GHG reductions attributed to switching from taxi may also be overestimated by ITDP since it may have included other lower GHG emitting modes such as ojek (motorcycle taxi) and bajaj (motorised 3 wheeler).

#### A9.2 Overall Assessment of Robustness of Pelangi/ ITDP GHG Emission Estimates

An assessment of the impact of several key assumptions used in the Pelangi/ITDP analysis of the estimated GHG emissions for the BRT is set out in Table A9.2 with reference to the full range of effects that could be considered based on those addressed by the two CDM methodologies. As shown in the table, the overall assessment is the estimated emissions reductions are likely optimistic although comparable to other experience.

Table A9.2: Comments on Robustness of Estimates of GHG Emission Reductions

Assumption	Likely Effect
Construction and maintenance emissions not calculated	-ve if included. But likely would not represent more than two years of average emission reductions for BRT. Up to 10% negative impact.
Upstream fuel emissions (ie 'well to tank') not accounted for	+ve, since net fuel saving is the cause of a net GHG reduction, Hence, not taking into account this effect is conservative.
Load factors of cars, buses and taxis do not change	+ve if included. Up to 10% positive impact if buses are better utilised. Since changes in vehicle emissions are the main contributor to GHG emission reductions increase in load factors would increase estimated emission reductions somewhat less than proportionately. The effect of taxi drivers increasing VKT to compensate for lost revenue is likely minor.
Access modes not accounted for	-ve since Pelangi/ ITDP did not directly account for how a mode switcher arrives at BRT stations. Up to 10% negative impact.
Reduction in car and motorcycle travel is assumed to occur in proportion to observed vehicle	-ve, ITDP/ Pelangi assumed that car passengers and drivers are equally likely to switch which is not

<b>Assumption</b>	<b>Likely Effect</b>
occupancies	borne out by studies of driver and passenger behaviour and the TE survey results leading to an overestimate of at least 20%. Switching car and motorcycle occupants assumed to have the same trip distance as other bus users. The effect of this assumption is unknown. Could lead to an overestimate or underestimate of GHG reductions.
Induced travel not assumed to occur due to BRT	Neutral since TE surveys very little new travel was induced by BRT.
Freer travel and reduced emissions for continuing road traffic	+ve, as much as mode switch for Mexico City Metrobus, perhaps up to 20%.
Effect of rebound due to 'vehicle left at home' or due to reduced congestion	-ve, since where congestion is severe some trips would be induced or at least some existing trips may change their time of travel e.g. move from shoulder peak to central peak period) or where vehicle ownership is low and where the average no. of household driver license holders may exceed the number of vehicles available, additional emissions may be incurred. Overall, rebound is assumed by STAP/ GEF (2010) offset the effect of reduced emissions due to freer travel.
Mode shift from buses results in reduced bus fleet – buses are assumed to be redeployed but to offset baseline bus needs	Neutral – baseline bus requirements increase although at a lower rate
Land use impacts	+ve, in the long term favourable land use adjustment would be expected to reduce emissions compared to the baseline. May be significant effect but not occur for several years.
Overall assessment compared to best estimate of GHG reduction	Slightly negative

Source: Terminal evaluation

### Attachment

A comparison of the two CDM methods and the TEEMP method including scope, applicability, formulation of the Baseline (also known as the Business as Usual or counterfactual) is shown in Table A9.3.

Table A9.3: Comparison of Two CDM Methodologies and GEF-endorsed BRT Ex-ante TEEMP Model

<b>Effect considered</b>	<b>Metrobus, Mexico City ACM 0016</b>	<b>Transmilenio, Bogota AM0031</b>	<b>GEF-endorsed TEEMP</b>
<b>Applicability</b>	MRTS – i.e. MRT/rail, BRT (closed systems – no dedicated feeder services)	BRT (with feeder bus so that passengers can go from their origin to their destination on the system)	All BRT
<b>Includes</b>	Any fuels including electricity and appears to	Fuel efficiency through new and larger buses;	All likely fuels, modes, and land use effects

Effect considered	Metrobus, Mexico City ACM 0016	Transmilenio, Bogota AM0031	GEF-endorsed TEEMP
	cover fuel efficiency due to new and larger vehicles & loading increases through better operations	mode switching; loading increases through better operations; fuel switch to low carbon fuels	through various factors
<b>BAU</b>	<ul style="list-style-type: none"> <li>• Mobile source emissions of different modes of transport due to the trips made by the passengers using the MRTS</li> <li>• Must represent a continuation of the existing public transport system</li> </ul>	<ul style="list-style-type: none"> <li>• Mobile source emissions of different modes of transport due to the trips made by the passengers using the BRT</li> <li>• Must represent a continuation of the existing public transport system</li> </ul>	<ul style="list-style-type: none"> <li>• Mobile source emissions of affected 'continuing' modes 'without' project – derived from assumption on future trip making, mode and vehicle choices</li> </ul>
<b>PROJECT</b>			
<b>Upstream Emissions</b>			
Construction	Yes	Yes	Yes
Upstream fuel emissions (ie 'well to tank')	No (conservative assumption)	Yes – uses a default multiplier of 0.14 but only when fuel is not refined in an Annex I country – exclusion is conservative	Yes – uses a default multiplier of 0.14
Vehicle replacement emissions (shortened life)	Not clear	Yes	No
Mobile source emissions of person trip using the project transport system			
<ul style="list-style-type: none"> <li>• <b>Direct emissions</b> - mode switch from bus, car, motorcycle, taxi etc</li> </ul>	Yes assuming proportion of vehicles avoided is same as ratio of number drivers to average vehicle occupancy	Yes assuming proportion of vehicles avoided is same as ratio of number drivers to average vehicle occupancy	Yes defined by assumption on mode switch from private vehicles
<ul style="list-style-type: none"> <li>• <b>Indirect emissions</b> accessing/ egressing project stations</li> </ul>	Yes	Yes	No
<b>Change of load factor, fuel efficiency and operational efficiency for project and continuing buses and taxis</b>	Yes	Yes	Yes

Effect considered	Metrobus, Mexico City ACM 0016	Transmilenio, Bogota AM0031	GEF-endorsed TEEMP
<b>Impact of reduced congestion on remaining roads</b>			
Congestion change – due to freed road space	Yes, estimated using a traffic model incorporating link-based speed and fuel consumption characteristics. Continuing vehicle speeds on 'affected roads' within 1 km of BRT corridor are monitored	Yes, estimated due to re-tired conventional buses taking less road space. Calculates changes in speed flow model and speed-related emissions factor. Not monitored	Assumed to be offset by traffic rebound
Congestion change – induced traffic/ rebound	Yes – not clear if calculated ex-ante but additional car and taxi vehicle distances and speeds on 'affected roads' are monitored	Yes – uses an elasticity of 0.1 in response to freed road space. Not monitored	See above
Subsequent land use changes	No	No	Factors included

Source: Table 1 of Sayeg and Bray (2012).

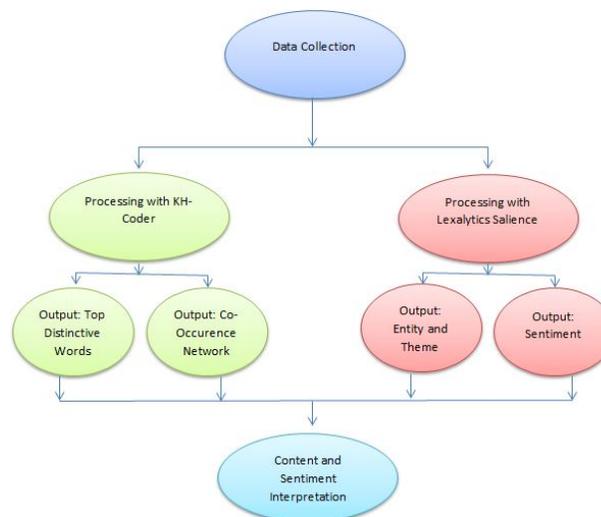
## Annex 10: Analysis of Media Reports

### A10.1 Introduction

Reports or news for this analysis were collected mainly from local newspapers such as Jakarta Post, Kompas and other online news. Old news were obtained from newspaper websites. We also utilized partly news from media clippings collected by the ITDP-Jakarta office. News cover articles from the year 2004 until 2013. During this period, one article was pre-selected for each particular month so the data set contains 120 articles.

### A10.2 Data Processing and Tools

In general, the data processing and tools for this study consists of two kinds, see Figure 1. First is the text mining and processing using a software namely KH Coder<sup>97</sup>. Coder can statistically analyses and produces frequencies of all words containing in the articles, also it can do a sentiment analysis that produce a rough rating of positive and negative comments. Secondly is the lexalytics salience<sup>98</sup>, this tool can do more detailed analysis of sentiment or “mood” given a data set. It produces index of positive and negative comments and also identify the subject who made the comments.



**Figure A10.1 Flow of Data Processing and Tools**

The text mining in Coder can be explained as the process of obtaining highly repeated information or words from textual data. Results from the text mining consists of relationship between words

<sup>97</sup> For reading on KH Coder we refer to <http://sourceforge.net/projects/khc/files/latest/download>

<sup>98</sup> On Lexalytics refer to <http://lexalytics.com/>

that has a high frequency (co-occurrence network) in the articles. This co-occurrence can be presented in the form of a relationship network of words. Co-occurrence network will consist of a node containing "word" in it and the connecting lines. The size of the node represents the frequency of words occurrence and the colour represents node centrality index [from blue (low frequency) to pink (high)], while the thickness of the connecting lines represents the strength of the relationship between words that are in the nodes. The words which presented in a co-occurrence network are words with frequencies higher than the minimum frequency, the filter of which has been set on the "filter words by term frequency" and the "filter edges". In other words, words with low frequency will not appear in the co-occurrence network.

Using Coder to construct the co-occurrence network ( Words-Words ), the minimum term frequency was set to 10 and the value of the filter edges was set to "top 60", while for the formation of co-occurrence network ( Words-Variables ) the minimum term frequency values was set to 40 and the value of the filter edges was set to "top 70". Co-occurrence network ( Words-Words ) will then be used to describe the content of articles each year and co-occurrence ( Words-Variables ) will be used to explain trend of articles content from the year 2004 up to 2013.

For sentiment analysis using KH Coder, it produces a sentiment graph which is based on the words that are coded to represent "mood". This is similar to a Regressive Imagery Dictionary (RID) known in linguistics. Two sets of RID words representing negative and positive expressions are created based on RID for the content analysis. The percentage of words which belong to the "negative expression" and "positive expression" is shown in the y-axis while the year when the words that appear is shown by the x-axis. By this one can trace the trend of a sentiment from a set of articles over time.

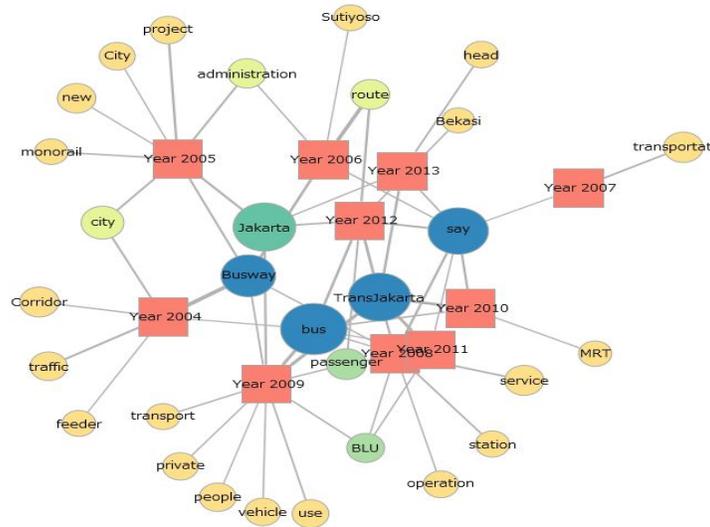
Lexalytics is also utilized for additional sentiment analysis regarding news related to BRT Transjakarta. It statistically measures the sentiment expressed in a rating scale from any person or subject such as user, academia or researcher, and organization or NGOs. Data processing with lexalytics salience will generate output in the form of table contains the entity, theme, and sentiment ratings.

Entity and theme is presented in the form of tables and side by side with the sentiment scores. This output will then be used to determine the articles sentiment in the mass media annually. It should be noted that the Lexalytics Salience Software do not decide the sentiment score range. It is just say whether it is positive or negative, but the software recommends a boundary of -0.2 to +0.2 for neutral sentiment score. For this study, we use a boundary for neutral of -0.2 to +0.2 set according to the recommendation explained in Lexalytics technical document.

## A10.3 Results

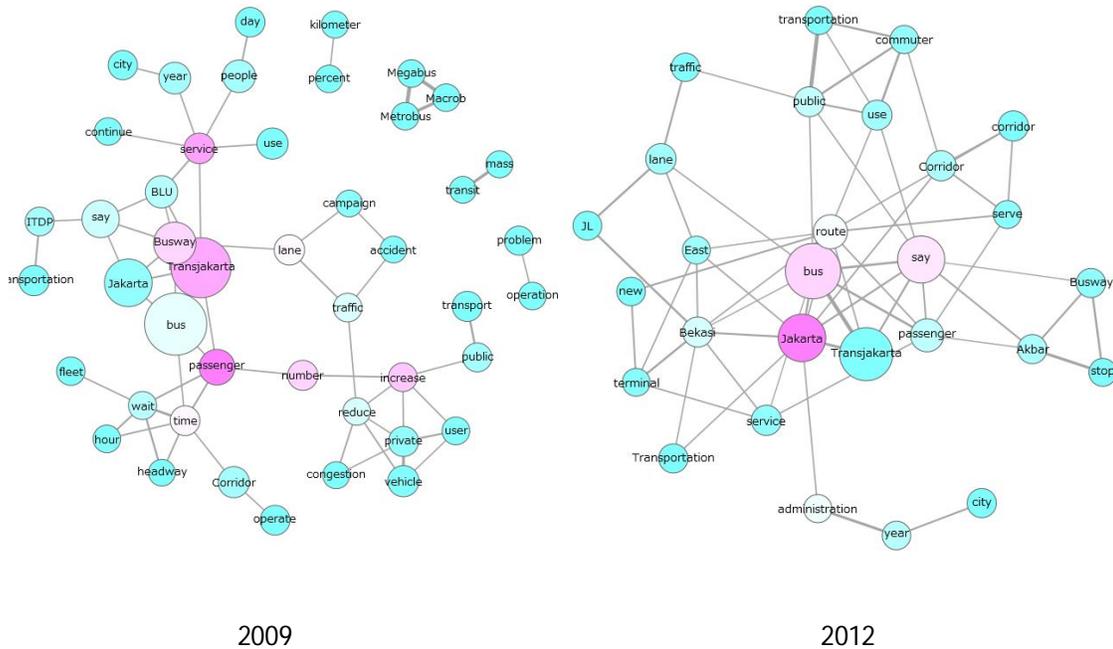
### A10.3.1 Co-Occurrence Network

Figure A10.2 shows the words-variables co-occurrence network. This graph shows the most frequent topics mentioned in the media for each variable, which in here the variable is the year in question. Almost all year mentioned "busway", "bus", "Transjakarta". In addition to that in 2004, for example, "feeder", "corridor", "traffic" and "city" were frequently mentioned, while in 2009 "transport" "private" "people" and "vehicle" were mentioned. These indicate that these particular topics or issues were frequently discussed in 2009.



**Figure A10.2 Co-occurrence Network (Words-Variables)**

Furthermore, to look into more details of what was being concerned in a particular year, the words-words co-occurrence network is very useful. To exemplify here we pick up the year 2009 and 2012, see Figure A10.3. This network can be explained as follow.



**Figure A10.3 Co-occurrence Network (Words-Words)**

In 2009, the word "TransJakarta" has high centrality and high frequency. "TransJakarta" co-occurred with the "passenger". This article shows this year, articles are discussing matters relating to the passenger. "Passenger" co-occurred with the words "wait" and "time". This indicates that the issue being discussed is about the passenger waiting time which related to the headway. "Passenger" was also co-occurred with "number" which related to "increase". This indicates that an increase in the number of passengers in 2009, although not yet reducing congestion and the use of private vehicles. "TransJakarta" also co-occurred with the word "service". This relates to the services provided by TransJakarta. Service here is related to the

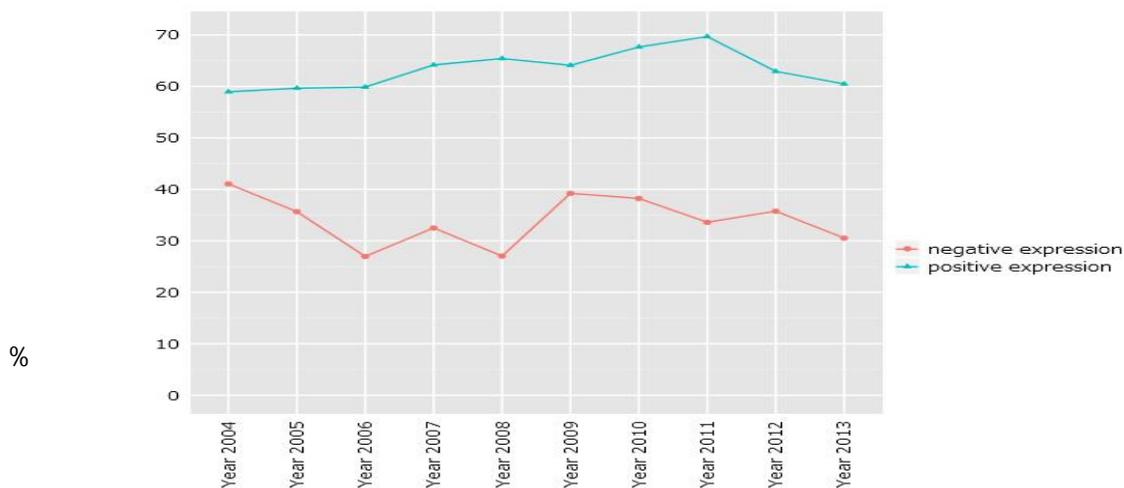
performance of Transjakarta to attract people to ride it each day. This is obtained by looking at the co-occurrence between "service" and "people".

For the year 2012, "TransJakarta" co-occurred with "bus" which co-occurred with "route" which co-occurred with "new" and then co-occurred with "terminal". This indicates about the addition of new routes of TransJakarta this year. "Route" also co-occurred with the word "Bekasi" which indicates that a new service which associated with Bekasi was opened, which is in this case is the feeder service from Bekasi. "Bus" also co-occurred with the "public" which then co-occurred with the words "use", "commuter", "transportation" and "car". This indicates that other things which also highlighted are programs which aim to attract commuters to choose public transportation, instead of private car.

Similar words-words co-occurrence network for each year were reproduced from 2004 to 2013, all of which explain more detailed issues or words mentioned in the media coverage on that particular year. For reasons of space, the words-words co-occurrence networks are not included here.

### A10.3.2 Sentiment Analysis

Data processing with KH coder generate the following graph.



**Figure. A10.3 Sentiment Graph (Results from Coder)**

Based on the sentiment graph above, it can be seen that for positive expression, there is an increase from time to time up until 2011 and then starting to decline until 2013. For negative expression, it can be seen that the graph scores highly negative expression in the beginning and continues to fluctuate, and getting worse in 2009. After the year 2009, the negative expression decreased but not significantly.

Interpretation for sentiment fluctuations from year to year can be seen from the gap between the negative and positive expression. As can be seen in Figure A10.4, the smaller the gap between the positive and negative expressions, it means there is a worsening image of Transjakarta. The bigger the gap means Transjakarta image getting better, which is in this cases happened in 2008 and 2011.

As indicated previously from Coder's sentiment analysis, the year 2004 was being the worst image of BRT Transjakarta, while year 2008 and 2011 are the best. Here more detailed examination are conducted using lexalytics salience by themes mentioned in the media. Themes were identified automatically by the software, worth noting these may be different from year to year depending on the content of the article of the media. Table A10.1 shows the results of sentiment analysis for year 2004, 2008 and 2011. For year 2004, there is a negative sentiment relates to the theme "traffic accidents" of -0.55. This theme deals with accidents involving TransJakarta. It is also supported by other theme, namely, the "head injuries" with the sentiments of -0.38 and "minor injuries" at -0.48. Another theme which has a negative sentiment is "traffic jam", which is equal to -0.49.

**Table A10.1 Sentiment from Lexalytics Salience**

Year 2004		Year 2008		Year 2011	
Themes	Sentiment	Themes	Sentiment	Themes	Sentiment
busway corridor	0,1	rush hour	-0,08	transjakarta bus	0,11
private vehicles	-0,12	ritola tasmaya	0,54	city administration	0,34
proper traffic signs	0,11	transjakarta bus service	0,53	legal status transjakarta	0,21
traffic accidents	-0,55	city administration	-0,04	organizational structures	0,21
busway buses	0,11	cutting subsidies	-0,5	phase change	0,21
warning vehicles	0,11	private funds	0,18	staff managers	0,21
minor injuries	-0,48	write-off budget items	0,18	provincial government	0,21
agency head	0,23	transjakarta bus	0,2	transjakarta buses	-0,04
head injuries	-0,38	busway management efficiency	0,49	provincial enterprises	0,21
feeder bus conductor	-0,29	maintaining rates	0,49	Improved condition of transfer stations	0,47
wearing deposit target system	-0,26	operators	0,49	transjakarta bus stop	-0,18
pedestrian bridges	0,27	transjakarta buses	-0,27	transjakarta system	0,34
operational costs	0,29	free primary school	-0,6	major overhaul	0,31
traffic jam	-0,49	subsidy cuts	0,54	rapid transit	0,31
broken leg	-0,38	raising rates	-0,5	poor service	-0,24
SUM (score):	-1,73		1,65		2,68

One can see the sentiment results for year 2008 and 2011. For 2008, the theme of "TransJakarta buses" obtain a bit of negative sentiment that is equal to -0.27. This is related with several problems which occur in such burning TransJakarta bus and service delays due to the limited supply of fuel. The theme "TransJakarta bus service" get a positive sentiment of 0.53 related to services at the time of Eid. The theme of "raising rates" sentiment is pretty negative of

-0.5. The positive sentiment at 0.49 is obtained by the theme "busway management efficiency", "maintaining rates" and "operators". Of these themes can be seen that this is related to the effort to prevent rising tariff of busway. The theme of "free primary" gets a negative sentiment of -0.6. This relates to the cancellation of free tariff for primary school due to budget cut, though already plan to be allocated for the busway.

In 2011, the theme of "poor service" gets the negative sentiment of -0.24. It is associated with the services provided by TransJakarta. Theme "TransJakarta system" gets a positive sentiment, which is 0.34. This is connected with TransJakarta route length. The theme of "major overhaul" get enough positive sentiment i.e. 0.31.

In general more positive sentiments were scored to every theme chosen in year 2008 and 2011 than that of 2004. A proxy score of sentiment is given in the last row, which are -1.73 , 1.65 and 2.68 respectively for year 2004, 2008 and 2011. Again this emphasizes that year 2004 is being the worst image of Transjakarta. This is understandable as the system had just been introduced. Image of Transjakarta fluctuates over time, however the year 2008 and 2011 were being Transjakarta peak image and positive impression publicly. After that period the system start to decline and getting worst bit by bit up until now, mainly due to slow business process and lack of operational competence and professionalism.

Various development plans, improvement and innovation of Transjakarta service obtains positive sentiments such as "improving the NMT facilities", "computerized admission ticket", "management system", "busway management efficiency", "maintaining rates", "fuel oil", and "environmentally friendly".

Of the trends each year, it can be concluded that the addition of TransJakarta fleet, routes, and corridor is something that is often highlighted by the media. The media also highlighted the things which still need to be repaired or improved by TransJakarta management, such as waiting times and the feeder services. The media also highlighted the innovation of TransJakarta such as electronic ticketing and electronic money. In general, the media also highlighted about Busway development and some issues which require continuous improvement. Finally at the end of year 2013, the DKI Jakarta parliament approved the formation of TransJakarta management as a limited liability company owned by local government. This decision will give the opportunities to run and manage Transjakarta company more professionally and independent from political intervention.

## Annex 11: Other Aspects of Efficiency

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The normal means of evaluating the efficiency of project investments used by International Financial Institutions (IFIs) such as the World Bank and Asian Development Bank, is by economic evaluation. Economic evaluation would quantify the net effect of: (i) the investment in infrastructure, vehicles, and operations and maintenance; and (ii) monetised welfare benefits to travellers (travel time and travel quality benefits), changes in road vehicle operating costs, including changes in values of road fatalities and injuries, and changes in externalities (e.g. air pollution and GHGs), on a whole of life basis compared to a base case or baseline (as for GHG assessment). Decision criteria such as Benefit-Cost Ratio, Net Present Value and Internal Rate of Return would be calculated to confirm the efficiency of investment.

It is striking that economic evaluation was not required to be undertaken by the project design. It does not even appear that estimates of travel time savings for Transjakarta passengers have been estimated in a comprehensive manner. Instead the focus was on GHG reductions. Success in reducing GHG emissions would in fact rely on the project effecting significant changes in traveller behaviour due to the travel time advantages provided by BRT as shown in the RToc. Further, an economic evaluation if had been conducted by the project would likely have shown that the monetised value of passenger travel time benefits would have greatly exceeded the monetised value of GHG and air pollution reduction.

A partial<sup>99</sup> economic evaluation of Transjakarta's Corridor 1 based on 2007 data by Indonesian and international researchers<sup>100</sup> shows that on the basis of an assumed travel time saving of five minutes per BRT passenger, the monetised value of time savings, was 10 times that of the monetised value in GHG reductions. Fuel savings, a component of reduced vehicle operating costs, enjoyed by motorists were estimated to be seven times travel time savings. This result is typical of BRT systems as shown by the evaluation of Metrobus, Mexico City, where time plus fuel savings to travellers were estimated to be two and half times the monetised value of GHG reductions even using a 'high' value per tonne reduced of GHG<sup>101</sup>. In the absence of an economic evaluation the project's cost effectiveness compared to MRT was examined as a Special Effectiveness Issue (refer main text).

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<sup>99</sup> Economic decision criteria were not calculated.

<sup>100</sup> Sutomo H., Romero, J., and Zusman, E.(2010), "The Co-benefits of Jakarta's Bus Rapid Transit (BRT): Getting the Institutions Right," Published by Institute of Global and Environmental Studies, Low Carbon Transport in Asia: Optimizing the Co-benefits of GHG Mitigation and Development.

<sup>101</sup> Schipper, L. et al. (2009). Considering Climate Change in Latin American and Caribbean Urban Transportation: Concepts, Applications, and Cases: Final Report, Prepared by Center for Global Metropolitan Studies, University of California, Berkeley, USA. [<http://metrostudies.berkeley.edu/pubs/reports/Shipper-ConsidClimateChange-LatinAmer.pdf>], Page 28.

## Annex 12: Evaluation TOR (without annexes)

### TERMS OF REFERENCE

#### Terminal Evaluation of the UNEP/GEF project “Bus Rapid Transit & Pedestrian Improvements Project in Jakarta”

## I. PROJECT BACKGROUND AND OVERVIEW

### 1. Project General Information<sup>102</sup>

**Table 1. Project summary**

<b>GEF project ID:</b>	2954	<b>IMIS number:</b>	GFL-2328-2720-4960
<b>Focal Area(s):</b>	Climate Change	<b>GEF OP #:</b>	11
<b>GEF Strategic Priority/Objective:</b>	SO-6	<b>GEF approval date:</b>	28 November 2006
<b>UNEP approval date:</b>	21 November 2006	<b>First Disbursement:</b>	22 January 2007
<b>Actual start date:</b>	December 2006	<b>Planned duration:</b>	60 months
<b>Intended completion date:</b>	December 2011	<b>Actual or Expected completion date:</b>	31 December 2012
<b>Project Type:</b>	FSP	<b>GEF Allocation:</b>	\$ 5,812,000
<b>PDF GEF cost:</b>	\$ 348,300	<b>PDF co-financing*:</b>	\$
<b>Expected MSP/FSP Co-financing:</b>	\$ 187,975,000	<b>Total Cost:</b>	\$ 194,135,300
<b>Mid-term review/eval. (planned date):</b>	August 2009	<b>Terminal Evaluation (actual date):</b>	July 2013
<b>Mid-term review/eval. (actual date):</b>	April – June 2010	<b>No. of revisions:</b>	2
<b>Date of last Steering Committee meeting:</b>	17 December 2012	<b>Date of last Revision:</b>	17 October 2011
<b>Disbursement as of 31</b>	EA- 5,721,539.00	<b>Date of financial closure:</b>	Not financially closed

<b>December:</b>	MTE- 50,460.73		
<b>Date of Completion:</b>	December 2012	<b>Actual expenditures reported as of 31 December 2012:</b>	\$5,524,884.64
<b>Total co-financing realized as of 31 December 2012:</b>	Total: \$117,888,282.11	<b>Actual expenditures entered in IMIS as of 31 December 2012:</b>	\$4,904,931.27
<b>Leveraged financing:</b>	Total: \$802,800.00		

## 2. Project rationale

1. The transport sector has consistently been one of the fastest growing emitters of GHGs and perhaps the most recalcitrant sector in terms of reducing emissions. Jakarta, Indonesia, made some important strides to address these problems with Bus Rapid Traffic (BRT), traffic demand management, and non-motorized transport improvements.
2. At time of project formulation/approval (2004) Jakarta, the capital of Indonesia, had a population over 8.3 million, and the greater Jakarta region was roughly double that number. The Special Capital City District of Jakarta (abbreviated as DKI Jakarta in Indonesian) covered an area of 650 square kilometres with an average population density of 13,000 inhabitants per sqkm. Household income for the Jakarta metropolitan area averaged US\$150/month. Nowadays the Jakarta metropolitan area (JABODETABEK –Jakarta, Bogor, Depok, Tangerang, Bekasi) is said to be the second largest population concentration on earth (after Tokyo) with 28 million inhabitants.
3. At project formulation, Jakarta's 16 million daily motorized trips generated some of the worst air pollution in the world, with NO<sub>x</sub>, TSP, and CO emissions regularly exceeding WHO standards. According to the World Bank's URBAIR study (1998)<sup>103</sup>, ambient concentrations of several pollutants routinely exceeded statutory limits. Concentrations of sulphur dioxide and nitrogen oxides could be 50% above allowable limits, and particulate matter (PM) could be three times higher. Lead remained a problem, although leaded gasoline had been phased out. Recent inventory estimates indicate that vehicle emissions account for about half of airborne particulates, 75% of NO<sub>x</sub>, and 90% of hydrocarbons. Research conducted in 1999, using dose response functions developed by WHO, showed that health costs from particulate (PM10) pollution alone were at least US\$ 270 million per year.
4. The number of private cars in Jakarta has doubled roughly every 10 years, reaching more than 4.5 million vehicles, of which 1.4 million cars, in 2004. Motorcycle registrations grew even more rapidly, doubling in Jakarta in the past two years before project formulation. While bus mode share was at project start at around a high of 50% of total trips, it was declining rapidly. Around 2004 Jakarta's traffic congestion is estimated to cost as much as US\$ 330 million for vehicle operating costs and US\$ 280 million for travel time every year. Without a change from current trends by 2020, congestion costs were projected to reach US\$ 7.8 billion annually.
5. With a very limited number of major arterials – and the expansion of this road network a significant threat to land for low income housing – BRT, traffic demand management, and improvements for non-motorized travel, are arguably the only option for Jakarta.
6. Prior to project start, the Governor of Jakarta clearly displayed his political will to tackle these problems. Political will, according to most project analysts, is the most important predictor of project success. Governor Sutiyoso opened Asia's first 12.9 km Curitiba-style BRT system in January of 2004, expanded the three-in-one (carpooling) traffic demand management scheme, and significantly improved sidewalks along Jl.Thamrin,

<sup>103</sup> Urban Air Quality Management Strategy in Asia: Jakarta Report, Technical Paper 379, World Bank, 1998.

shifting many short trips to walking trips. Each of these measures successfully reduced car travel, and shifted some daily transit trips from private motor vehicles to transit and non-motorized modes. During most of the actual project execution the project dealt with a new (elected) Governor, Fauzi Bowo, who continued to a certain extent to support the new BRT project. However, the forecasted 15 busway corridors were brought back to 12 corridors with the concern that quality would be more important for passengers than quantity of bus routes. Notwithstanding, also the quality of many bus corridors declined over the last years of project execution. The newly elected Governor Joko Widodo (“Jokowi”), who took office in December 2012, appears to be again more supportive of the BRT and non-motorized transportation (NMT) concept and promises to implement a number of the projects’ most recent recommendations. Also Governor Widodo is confronted – similar to all his predecessors - with a large number of conflicting recommendations about the future of infrastructure in the metropolis (commuters and car owners, car marketing lobby, city planners, monorail promoters, etc).

7. The decentralization of authority and budgets following the end of the Suharto-era has meant local governments, including DKI Jakarta, have been struggling to handle the suddenly increased workload. Governor Sutiyoso rushed the BRT project through using, in some cases, agencies with little experience in conducting such a project. Jakarta implemented its first BRT corridor in only 8 months’ time, making it the fastest known implementation of any full BRT in the world. However, in the process, some technical mistakes were narrowly avoided, and others were made and needed to be corrected instantly.

8. Early intervention from the Institute for Transportation and Development Policy (ITDP) prior to project start and Indonesian NGO partners helped to bring about public support for the BRT despite the shortcomings, while technical support helped to fix some design shortcomings. Without early information on BRT being brought to Jakarta, the busway would have been in the curb lane, for instance, and the enclosed bus stops would have only been about 10 square meters in size. Other advice was not yet incorporated in time during the system’s rapid implementation. As a result, Corridor 1 was built with a design capacity that could only handle about 6,000 passengers per direction at the peak. With proper operation and minor infrastructure changes, the capacity could readily be doubled to 12,000. Adding overtaking lanes at stations would allow the estimated capacity to reach 35,000 – a measure that has yet to be taken at project closure. This poor initial design was immediately used by powerful lobbying interests to argue for the replacement of the BRT system with far more expensive technologies (monorail, metro).

9. Toward GEF-funded project end, 12 corridors (of the original 15) are operational, with an estimated 350,000 passengers per day over approx. 200 km of exclusive bus lanes. This will make the TransJakarta busway (one of) the largest BRT schemes in the world in terms of length of corridors but not in terms of ridership.

10. Electronic Ticketing has been introduced on an extended pilot basis since March 2013, while the concept of Direct Services will be piloted anytime soon: smaller buses with routes outside the busway corridors will use (part of ) the exclusive BRT bus lanes in order to increase passenger flow and serve as feeders to the existing TransJakarta operations. This should bring actual ridership of the busway to approx. 1 million passengers per day within the next 3 years of continued TransJakarta operations that are to be serviced by twice as many busses as the 670 units now plying the BRT routes.

11. Most of the BRT busses are fuelled not by diesel but by compressed natural gas. Now that Corridor 1 has reached maximum capacity, the older (diesel) busses are replaced by a new type of bus that has double the capacity (articulated) and is also powered by compressed natural gas.

12. “Greenways” for pedestrians and bicycles are now being realized to provide more and better access from residential areas to the existing busway routes.

### 3. Project objectives and components

13. Faced with increasing congestion, cities have attempted to increase roads, allocating more space for private motor vehicles. A predictable result has been induced traffic demand, as the low marginal cost of operating a private vehicle leads to choices resulting in increased trip distances. The too common result of the road-building cycle is the return of congestion. Then, sprawling low-density land-use results in significantly higher energy use than before. The steadily increasing energy use in the transportation sector is likely the single largest threat to long-term reductions in GHG emissions on a global level. The sprawl and returning congestion cycle continue as public transportation steadily declines.

14. This project addresses a fundamental cause of the transportation sector's steadily increasing energy use – increasing allocation of public space to private cars in the form of unrestricted roads – by reallocating road space exclusively to public transit. BRT makes this reallocation possible with a system that delivers maximum capacity to carry passengers per meter of road width at a much lower cost than rail alternatives. Once BRT is providing an incentive for travel by public transit, there is an immediate demand for the improvement of pedestrian facilities, and an opportunity to improve NMT facilities. Once these more energy efficient alternatives are in place, the potential opens for application of transportation demand management (TDM) measures to shift the balance further away from private motor vehicle travel.

15. According to the Project Document, the **overall objective** of this project was to maximize effectiveness of the Jakarta BRT and use it as a catalyst for urban transport reform in Jakarta and other key Indonesian cities. The project was to address the key root cause of urban transport un-sustainability: a dysfunctional transport pricing structure which de facto subsidizes private motor vehicle use by undervaluing scarce public space. Building on Jakarta's introduction of BRT service, the project aimed to increase the effectiveness of this service by increasing its capacity, speed, and the area of population served in order to dramatically expand the modal shift impacts. This would provide an alternative to motor vehicles that reduced both travel time and travel cost, the two key factors in transport modal choice.

16. The **overall purpose** of the project was to address the local capacity shortcomings primarily through extensive assessment, technical assistance and training programs, which eventually was hoped to bring more ridership of the BRT. The programme would be aided by two key factors: (i) the presence of a functioning BRT and the resulting urgency to learn how to improve and optimize it; and (ii) the popularity, despite its shortcomings, of the BRT system with the public. The project was to build on these two factors, seeking to improve the performance of the Jakarta BRT system. This would result in a further modal shift in Jakarta and an improved public image for further BRT expansion, in Jakarta as well as other cities in Indonesia.

17. The Jakarta BRT system's performance would improve by providing technical assistance and training to help to optimize routing, infrastructure and traffic design, operations and public information. Then analysis and training were to focus on rerouting the remaining public transit system to better complement BRT. TDM measures would be promoted for Jakarta's central area<sup>104</sup> to provide additional incentives to shift from private motorized vehicles to BRT while pedestrian and NMT facilities and zones would be used to help promote land use change near the BRT corridors.

18. The project was organized into two main goals and 9 components with associated outcomes (Table 2), each to be delivered by a set of 5-8 activities. The first eight (of nine) components in this project focused on ensuring the success of the Jakarta BRT system, through its optimized implementation and expansion from its current single corridor to a full system of 14 corridors, covering most of the city, over the next five years. Component 9 focused on dissemination activities, in particular assisting other Indonesian cities in establishing sustainable transport programs and transferring knowledge and other achievements gained in the Jakarta aspects of the project. Each activity was designed to complement the efforts of the city of Jakarta and provide funding for tasks which Jakarta was not able to do under a baseline scenario.

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<sup>104</sup> Initially, the NMT component of the project was planned for Yogyakarta, another city on Java.

Table 2. Goals, components and expected outcomes

Goals	Component	Outcome
Goal A: Improve Performance of the Jakarta BRT	<b>1. Develop BRT corridors 4-14</b>	BRT implemented on corridors 4-14 with routes optimized
	<b>2. Optimize fare system for corridors 1-14</b>	Integrated fare system with controls stops fare leakage. Competitive contracting implemented for BRT bus operation, reducing costs
	<b>3. Improve intersection performance for BRT</b>	Intersection conflicts reduced to acceptable levels. BRT average speed increases to 25km/hr; improved political support for BRT by reducing impacts on mixed traffic
	<b>4. Optimize busway operation</b>	Increased average speed of BRT, 5% reduction of fleet downtime, reduced operating costs; 8% reduction in fuel consumption
Goal B: Utilize BRT to build image of public transport and improve pedestrian, TDM, NMT, and land use options	<b>5. Improve public information on BRT &amp; public transport</b>	Public understanding of BRT and optimal use of public road space increased. Web and SMS based routing information system available to potential passengers.
	<b>6. Rationalize non-BRT bus routes</b>	Increase of passenger from bus feeder system from 5% to 13% of BRT passengers; of which 32 % are new passengers and 32 % shifted from PMV feeder, reducing PMV feeder trips and increasing total BRT passengers
	<b>7. Evaluate and implement Transport Demand Management measures to reduce private motor vehicle use</b>	TDM measure implemented so that cost of PMV use is greater than BRT fare
	<b>8. Improve pedestrian and NMT facilities in centre and along corridors</b>	Convenient NMT and pedestrian facilities; increased feeder trips by bicycle
	<b>9. Dissemination and outreach to other cities</b>	Full BRT implemented in 1 of target cities; BRT draws some passengers from private motor vehicles. Or increased number of students walking and biking to school / increased use of bicycle for short trips

Source: Project logframe – Project Document Annex B

#### 4. Executing Arrangements

19. The **Implementing Agency** for the project was the United Nations Environment Programme (UNEP). In this capacity, UNEP had overall responsibility for the implementation of the project, project oversight, and coordination with other GEF projects. In addition, UNEP was responsible for reporting the carbon emissions reductions resulting from project activities to national registries and/or international inventories.

20. The **lead Executing Agency** for the project was the **Institute for Transportation and Development Policy (ITDP)**<sup>105</sup>, working in close association with the relevant agencies of DKI Jakarta and a number of local and international NGOs. Funds were provided to Indonesian NGO's with experience and interest in the transport sector to support their involvement in the project. ITDP signed some MOUs to clarify the purpose, objectives, tasks, mechanisms and financial relationship with each partner. ITDP employed five locally-hired project staff. The Jakarta government was to provide two administrative staff persons and office space at a location most appropriate for the tasks required (this was supposed to be either at the Transportation or Planning Agency). This office was responsible for all local coordination and arrangements for expert visits, development and implementation of training programs and workshop, as well as for administering contracts with local consultants and NGOs.

21. The project was to report and be accountable to the **Project Steering Committee (PSC)** which should convene every six (6) months. The functions of the PSC were to:

- Provide direction and guidance to the Project
- Monitor and supervise implementation of the Project
- Endorse adaptations to the Project components during the Project execution
- Evaluate the performance and impacts of the Project
- Approve Progress, Midterm and Terminal Reports of the Project

22. The PSC was composed of The Governor of Jakarta (PSC Chair), a representative from UNEP-GEF, one representative from each Jakarta Government agency involved in the project, 3 representatives from Indonesian NGOs, and the Asia Regional Director for ITDP who were all full voting members. The PSC could also invite observers to its regular meetings (e.g. Experts involved in the Project implementation, representatives from other cities) to speak or report on certain aspects of the Project.

23. The **Project Management Unit (PMU)** reported to the PSC and was comprised of a Project Director, a Programme Coordinator, Coordinators for training, research and public relations, and an administrative officer. It had the following functions:

- Provide technical and operational guidance to the Programme
- Coordinate expert assistance, training and workshop programs
- Implement data gathering (surveys)
- Monitor and evaluate the progress of the activities and approve quarterly planning of activities

24. Additional experts were to analyse and recommend options and provide training for enhancing BRT ridership through improvement of pedestrian facilities, land use redevelopment of the area around the north end of bus corridor 1 (the historic inner city), bicycle facilities such as paths and secure parking around BRT stations throughout the city, and through traffic demand management.

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<sup>105</sup> The Institute for Transportation and Development Policy (ITDP) is a global organization with HQ in New York, founded in 1985 as an umbrella organization for several worldwide peace and development initiatives and advocacy efforts, to promote environmentally sustainable and socially equitable transportation worldwide. See: <http://www.itdp.org>

## 5. Project Cost and Financing

25. The estimated project costs at design with associated funding sources are presented in Table 3.

**Table 3. Estimated project cost**

<b>Cost to the GEF Trust Fund:</b>		<b>US\$</b>	<b>%</b>
Project		5,812,000	
PDF-B		348,300	
<b>Subtotal GEF</b>		<b>6,160,300</b>	<b>3.20</b>
<b>Co-financing</b>			
	<b>In-kind</b>	<b>Cash</b>	<b>Total</b>
ITDP	-	104,000	104,000
Government of Jakarta	210,000	187,661,000	187,871,000
<b>Sub-total Co-financing:</b>		<b>187,975,000</b>	<b>96.80</b>
<b>TOTAL PROJECT COST</b>		<b>194,135,300</b>	<b>100.00</b>

26. Cash financing consisted first of all of budgeted amounts by the Jakarta Government for contracted services to build project infrastructure. These costs are primarily for construction of the BRT (bus lanes, bus stations and overpasses, ramps, busses), with other expenditures for construction of related pedestrian facilities. The co-financing figures here were an estimation of expenditures at project proposal stage for this activity and need to be verified. The Jakarta Government built the first BRT corridor at its own expense and without financial assistance of any kind.

27. During the project preparatory PDF-B phase, additional information was gathered on budget expenditures. Future Jakarta budgets beyond 2006 were uncertain, so the resources available for project activities provided here were estimates at the time of project formulation, developed in cooperation with the DKI Jakarta, Department of Planning, and reflecting their commitment to the full project (then).

28. The project proponents used a very conservative method to estimate co-financing. Budgets are approved annually by the parliament between October and December for expenditure during the next calendar year. Budgets beyond 2006 were approved after work under this project had begun. For this reason, budget figures for the 5-year life of the project were the actual 2006 Jakarta 1-year budget multiplied by 2 (instead of 5). Given that at project end in Dec 2012, 12 corridors have actually been realized, co-financing levels should have been adequate but need yet to be verified.

## 6. Implementation Issues

29. A Mid Term Evaluation (MTE) of the project was conducted between April and August 2010. The project was rated overall as moderately unsatisfactory, reflecting the necessary adaptations to the project that were required to overcome problems of governance and accountability, originating from the period before the project during which the BRT was launched in a rush.

30. The MTE attributed slow progress on most components during the first project years to the public service bureaucracy which prevented Government to detect or to respond to public demand, good managerial values or professional principles. The BRT was oriented to regulatory compliance rather than service to the people of Jakarta. Even the new institutional arrangement of Public Service Agency (BLU) was oriented to Minimum Service Standards, rather than incentives to continually improve performance. The MTE also concluded that most technical problems identified in the evaluation, and the actions needed to overcome them, had already been highlighted in advice provided by ITDP and others. BRTs around the world had similar technical problems, and ITDP had consistently supplied professional advice to the relevant DKI Jakarta agencies.

31. Despite some weaknesses found in the project design and changes made to the scope of work during implementation, the MTE found the project remarkably well managed, both by the ITDP team, and the DKI

counterparts. There was high country ownership / driven-ness, most stakeholders were involved, and UNEP provided satisfactory supervision and backstopping. Also, while the design of the M&E system was found wanting, the actual monitoring and evaluation had generally been thorough and well-documented.

32. The MTE recommendations were generally well received by the Executing Agency (ITDP) as well as the City Government of DKI Jakarta. Project monitoring was greatly facilitated by the release of monthly project progress report that were based on the (revised) objectives of the MTE as it became easier to identify issues that were facing delay. However, with the slow process of adapting such recommendations (annual budgets are prepared a half year before the next fiscal year), actual improvements for the riding public were rather slow and often short of the expectations. Recently signage at the bus stations was greatly enhanced, a (GIS based) fleet management system is finally under development, and the e-ticketing system is to be rolled out in 2013.

33. Already before the Mid Term Evaluation (MTE) was conducted, it became clear that the operations of the TransJakarta Busway (i.e. quality of services offered) would greatly improve if TransJakarta would transform from a Public Service Agency (a BLU) into a real Corporation (a BUMD) as this would greatly improve management and accelerate the decision making process and budgeting (that would no longer need to be approved by City Council). The MTE confirmed the appropriateness of such a transformation. Substantial project funds were used for legal and regulatory advice on all aspects of the BLU-BUMD transformation process and this became one of the foremost reasons to actually (budget neutrally) extend the project with one extra year. However, in hindsight, even a one year project extension appeared not to be sufficient for TransJakarta to obtain BUMD status, as the political process of DKI Jakarta gubernatorial elections of 2012 delayed the entire process. It is expected that TransJakarta will be awarded BUMD status in 2013.

## II. TERMS OF REFERENCE FOR THE EVALUATION

### 1. Objective and Scope of the Evaluation

34. In line with the UNEP Evaluation Policy<sup>106</sup>, the UNEP Evaluation Manual<sup>107</sup> and the Guidelines for GEF Agencies in Conducting Terminal Evaluations<sup>108</sup>, the Terminal Evaluation of the Project “Bus Rapid Transit **and Pedestrian Improvement Project in Jakarta**” is undertaken after completion of the project to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. The evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP, the GEF and their executing partners – ITDP and the relevant agencies of DKI Jakarta in particular. Therefore, the evaluation will identify lessons of operational relevance for future project formulation and implementation. It will focus on the following sets of **key questions**, based on the project’s intended outcomes, which may be expanded by the consultants as deemed appropriate:

- (a) How and to what extent did the project have an impact on the modal split of road users in DKI Jakarta? Was the project able to reverse the situation that more people (at project start) were opting for private motor vehicles? Were any behavioural changes achieved with Jakarta’s citizens? Were predictions in the Project Document for the modal split adequate? Did it indeed lead to any “transit-oriented urban revitalization” as mentioned in the ProDoc?
- (b) What is the global and local environmental impact of the busway project, including NMT and TDM? Ambitious targets were set at project formulation. During the course of project execution, calculation methods of the environmental impact have been revised. Did the use of compressed natural gas instead of diesel have a substantial impact on both global and local environment?
- (c) Has the TransJakarta project (both BRT and NMT) made any contribution to similar developments in other cities in Indonesia (and beyond)? Were project lessons and guidelines for sustainable transport project implementation also disseminated across the country? Is there any evidence on the catalytic role of the project towards other cities in Indonesia learning from Jakarta and adopting lessons learned and good practices from the project demonstrations?
- (d) During project execution time and again, alternative mass transit options (e.g. Light Rail Transit, Monorail) emerged for discussion in Jakarta. How does - for a city such as Jakarta - BRT compare overall in terms of project cost, project preparation (effort and time) as well as environmental impact?
- (e) What was then the projects’ impact on TransJakarta management as well as on Jakarta’s Transportation Agency (Dishub)? To what extent has the project influenced the policy of the incoming city government administration in the area of BRT, NMT and TDM?
- (f) What was the projects’ impact in the Non Motorized Transportation (NMT) sector? Did the project lead to clear progress for NMT and associated facilities (pedestrian lanes, bicycle paths - and network- as well as parking)?

### 2. Overall Approach and Methods

35. The terminal evaluation of the Project “Bus Rapid Transport and Pedestrian Improvement Project in Jakarta” will be conducted by independent consultants under the overall responsibility and management of the UNEP Evaluation Office (Nairobi), in consultation with the UNEP GEF Coordination Office (Nairobi), and the UNEP Task Manager at UNEP/DTIE.

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<sup>106</sup> <http://www.unep.org/eou/StandardsPolicyandPractices/UNEPEvaluationPolicy/tabid/3050/language/en-US/Default.aspx>

<sup>107</sup> <http://www.unep.org/eou/StandardsPolicyandPractices/UNEPEvaluationManual/tabid/2314/language/en-US/Default.aspx>

<sup>108</sup> [http://www.thegef.org/gef/sites/thegef.org/files/documents/TE\\_guidelines7-31.pdf](http://www.thegef.org/gef/sites/thegef.org/files/documents/TE_guidelines7-31.pdf)

36. It will be an in-depth evaluation using a participatory approach whereby key stakeholders are kept informed and consulted throughout the evaluation process. Both quantitative and qualitative evaluation methods will be used to determine project achievements against the expected outputs, outcomes and impacts.
37. The findings of the evaluation will be based on the following:
- (a) A **desk review** of project documents and others including, but not limited to:
    - Relevant background documentation, inter alia UNEP and GEF policies, strategies and programmes pertaining to sustainable transport;
    - Project design documents; Annual Work Plans and Budgets or equivalent, revisions to the logical framework and project financing;
    - Project reports such as progress and financial reports from the executing partners to the Project Management Unit (PMU) and from the PMU to UNEP; Steering Group meeting minutes; annual Project Implementation Reviews and relevant correspondence;
    - Documentation related to project outputs;
    - Review of media articles over the last 3-4 years concerning the BRT transport system in Jakarta.
  - (b) **Interviews** with:
    - Project management and execution support at ITDP Headquarters, New York, USA;
    - UNEP Task Manager and Fund Management Officer (Nairobi);
    - Jakarta Authorities & NGOs: The Governor/deputy Governor of DKI Jakarta, the GM of TransJakarta, the Head of the Jakarta Transportation Agency (DisHub), the Head of Economic Affairs – DKI Jakarta, Traffic Police, transport oriented NGOs and Academia;
    - Relevant staff of GEF Secretariat; and
    - Representatives of other multilateral agencies and other relevant organisations.
  - (c) **Country visit.** The evaluation team will visit Jakarta to interview key stakeholders - including BRT users – and observe and use the BRT system and other transport facilities supported and not supported by the project.

### 3. Key Evaluation principles

38. Evaluation findings and judgements should be based on **sound evidence and analysis**, clearly documented in the evaluation report. Information will be triangulated (i.e. verified from different sources) to the extent possible, and when verification was not possible, the single source will be mentioned. Analysis leading to evaluative judgements should always be clearly spelled out.

39. The evaluation will assess the project with respect to **a minimum set of evaluation criteria** grouped in four categories: (1) Attainment of objectives and planned results, which comprises the assessment of outputs achieved, relevance, effectiveness and efficiency and the review of outcomes towards impacts; (2) Sustainability and catalytic role, which focuses on financial, socio-political, institutional and ecological factors conditioning sustainability of project outcomes, and also assesses efforts and achievements in terms of replication and up-scaling of project lessons and good practices; (3) Processes affecting attainment of project results, which covers project preparation and readiness, implementation approach and management, stakeholder participation and public awareness, country ownership/driven-ness, project finance, UNEP supervision and backstopping, and project monitoring and evaluation systems; and (4) Complementarity with the UNEP strategies and programmes. The evaluation consultants can propose other evaluation criteria as deemed appropriate.

40. **Ratings.** All evaluation criteria will be rated on a six-point scale. However, complementarity of the project with the UNEP strategies and programmes is not rated. Annex 2 provides detailed guidance on how the different criteria should be rated and how ratings should be aggregated for the different evaluation criterion categories.

41. In attempting to attribute any outcomes and impacts to the project, the evaluators should consider the difference between *what has happened with and what would have happened without the project*. This implies that there should be consideration of the baseline conditions and trends in relation to the intended project outcomes and impacts. This also means that there should be plausible evidence to attribute such outcomes and impacts to the actions of the project. Sometimes, adequate information on baseline conditions and trends is lacking. In such cases this should be clearly highlighted by the evaluators, along with any simplifying

assumptions that were taken to enable the evaluator to make informed judgements about project performance.

42. As this is a terminal evaluation, particular attention should be given to learning from the experience. Therefore, the “*Why?*” question should be at front of the consultants’ minds all through the evaluation exercise. This means that the consultants needs to go beyond the assessment of “*what*” the project performance was, and make a serious effort to provide a deeper understanding of “*why*” the performance was as it was, i.e. of processes affecting attainment of project results (criteria under category 3). This should provide the basis for the lessons that can be drawn from the project. In fact, the usefulness of the evaluation will be determined to a large extent by the capacity of the consultants to explain “*why things happened*” as they happened and are likely to evolve in this or that direction, which goes well beyond the mere review of “*where things stand*” today.

## 4. Evaluation criteria

### A. Strategic relevance

43. The evaluation will assess, in retrospect, whether the project’s objectives and implementation strategies were consistent with: i) Sub-regional environmental issues and needs; ii) the UNEP mandate and policies at the time of design and implementation; and iii) the GEF Climate Change focal area, strategic priorities and operational programme(s).

44. It will also assess whether the project objectives were realistic, given the time and budget allocated to the project, the baseline situation and the institutional context in which the project was to operate.

### B. Achievement of Outputs

45. The evaluation will assess, for each component, the project’s success in producing the programmed results as presented in Table 2 above, both in quantity and quality, as well as their usefulness and timeliness. Briefly explain the degree of success of the project in achieving its different outputs, cross-referencing as needed to more detailed explanations provided under Section 6 (which covers the processes affecting attainment of project objectives). The achievements under the regional and national demonstration projects will receive particular attention.

### C. Effectiveness: Attainment of Objectives and Planned Results

46. The evaluation will assess the extent to which the project’s objectives were effectively achieved or are expected to be achieved.

47. The evaluation will reconstruct the Theory of Change (ToC) of the project based on a review of project documentation and stakeholder interviews. The ToC of a project depicts the causal pathways from project outputs (goods and services delivered by the project) over outcomes (changes resulting from the use made by key stakeholders of project outputs) towards impact (changes in environmental benefits and living conditions). The ToC will also depict any intermediate changes required between project outcomes and impact, called intermediate states. The ToC further defines the external factors that influence change along the pathways, whether one result can lead to the next. These external factors are either drivers (when the project has a certain level of control) or assumptions (when the project has no control).

48. The assessment of effectiveness will be structured in three sub-sections:

- (a) Evaluation of the **achievement of direct outcomes as defined in the reconstructed ToC**. These are the first-level outcomes expected to be achieved as an immediate result of project outputs.
- (b) Assessment of the **likelihood of impact** using a *Review of Outcomes to Impacts* approach as summarized in Annex 6 of the TORs. Appreciate to what extent the project has to date contributed, and is likely in the future to further contribute to changes in stakeholder behaviour as a result of the project’s direct outcomes, and the likelihood of those changes in turn leading to changes in the natural resource base, benefits derived from the environment and human living conditions.
- (c) Evaluation of the **achievement of the formal project overall objective, overall purpose, goals and component outcomes** using the project’s own results statements as presented in original logframe (see Table 2 above) and any later versions of the logframe. This sub-section will refer back where applicable to sub-sections (a) and (b) to avoid repetition in the report. To measure

achievement, the evaluation will use as much as appropriate the indicators for achievement proposed in the Logical Framework Matrix (Logframe) of the project, adding other relevant indicators as appropriate. Briefly explain what factors affected the project's success in achieving its objectives, cross-referencing as needed to more detailed explanations provided under Section F.

49. There are some effectiveness questions of specific interest which the evaluation should certainly consider:

- BRT TransJakarta: Effectiveness of the network as realized over the last 6 years of project execution including measures to increase passenger flow/bus flow, such as resizing of busses and stations along planned corridors, (lack of) bus priority at intersections (and absence of tunnels or fly-overs), the slow realization of a fleet management system with a control center and/or other solutions to avoid bus bunching & improve bus spacing, inclusion of clauses of merit with penalties and incentives in bus service contracts with private companies etc.
- E-ticketing: Effectiveness of the system in speeding up passenger flows, reduce revenue leakage and provide data on origin-destination of busway passengers for better planning of bus operation. To what extent will the new electronic ticketing system integrate with the rest of the public transport system and with the accounting system, and provide TransJakarta with real time information on revenue and passenger-transfer data. Are the necessary conditions in place for the integrated electronic fare collection system to function properly?
- Transportation Demand Management (TDM): The effectiveness of newly formulated parking restrictions in the central business district of Jakarta. Will it contribute to more daily riders in public transport?
- Non Motorized Transport (NMT): how effective were the past publicity campaigns, safety measures and the few newly constructed cycling routes in promoting a shift from private motorized to non-motorized transportation in the city?
- Outreach: How effectively were project lessons and guidelines for sustainable transport project implementation disseminated across Indonesia?

#### D. Sustainability and replication

50. Sustainability is understood as the probability of continued long-term project-derived results and impacts after the external project funding and assistance ends. The evaluation will identify and assess the key conditions or factors that are likely to undermine or contribute to the persistence of benefits. Some of these factors might be direct results of the project while others will include contextual circumstances or developments that are not under control of the project but that may condition sustainability of benefits. The evaluation should ascertain to what extent follow-up work has been initiated and how project results will be sustained and enhanced over time. The reconstructed ToC will assist in the evaluation of sustainability.

51. Four aspects of sustainability will be addressed:

- (a) *Socio-political sustainability*. Are there any social or political factors that may influence positively or negatively the sustenance of project results and progress towards impacts? Is the level of ownership by the main national and regional stakeholders sufficient to allow for the project results to be sustained? Are there sufficient government and stakeholder awareness, interests, commitment and incentives to execute, enforce and pursue the programmes, plans, agreements, monitoring systems etc. prepared and agreed upon under the project?
- (b) *Financial resources*. To what extent are the continuation of project results and the eventual impact of the project dependent on continued financial support? What is the likelihood that adequate financial resources<sup>109</sup> will be or will become available to implement the programmes, plans, agreements, monitoring systems etc. prepared and agreed upon under the project? Are

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<sup>109</sup> Those resources can be from multiple sources, such as the public and private sectors, income generating activities, other development projects etc.

there any financial risks that may jeopardize sustenance of project results and onward progress towards impact?

- (c) *Institutional framework.* To what extent is the sustenance of the results and onward progress towards impact dependent on issues relating to institutional frameworks and governance? How robust are the institutional achievements such as governance structures and processes, policies, sub-regional agreements, legal and accountability frameworks etc. required to sustaining project results and to lead those to impact on human behaviour and environmental resources? A specific question of interest in the case of TransJakarta is to identify the opportunities and obstacles for expansion of the feeder system and the BRT corridors to other parts of the JABODETABEK Metropolitan Area and the (complementary) role of BRT vs. Mass Rail and Light Rail options.
- (d) *Environmental sustainability.* Are there any environmental factors, positive or negative, that can influence the future flow of project benefits? Are there any project outputs or higher level results that are likely to affect the environment, which, in turn, might affect sustainability of project benefits? Are there any foreseeable negative environmental impacts that may occur as the project results are being up-scaled?

52. **Catalytic role and replication.** The *catalytic role* of GEF-funded interventions is embodied in their approach of supporting the creation of an enabling environment and of investing in pilot activities which are innovative and showing how new approaches can work. UNEP and the GEF also aim to support activities that upscale new approaches to a national, regional or global level, with a view to achieve sustainable global environmental benefits. The evaluation will assess the catalytic role played by this project, namely to what extent the project has:

- (a) *catalyzed behavioural changes* in terms of use and application by the relevant stakeholders of: i) technologies and approaches show-cased by the demonstration projects; ii) strategic programmes and plans developed; and iii) assessment, monitoring and management systems established at municipal and national level;
- (b) provided *incentives* (social, economic, market based, competencies etc.) to contribute to catalyzing changes in stakeholder behaviour;
- (c) contributed to *institutional changes*. An important aspect of the catalytic role of the project is its contribution to institutional uptake or mainstreaming of project-piloted approaches in the regional and national demonstration projects;
- (d) contributed to *policy changes* (on paper and in implementation of policy);
- (e) contributed to sustained follow-on financing (*catalytic financing*) from Governments, the GEF or other donors;
- (f) created opportunities for particular individuals or institutions ("*champions*") to catalyze change (without which the project would not have achieved all of its results).

53. *Replication*, in the context of GEF projects, is defined as lessons and experiences coming out of the project that are replicated (experiences are repeated and lessons applied in different geographic areas) or scaled up (experiences are repeated and lessons applied in the same geographic area but on a much larger scale and funded by other sources). The evaluation will assess the approach adopted by the project to promote replication effects and appreciate to what extent actual replication has already occurred or is likely to occur in the near future. What are the factors that may influence replication and scaling up of project experiences and lessons?

## E. Efficiency

54. The evaluation will assess the cost-effectiveness and timeliness of project execution. It will describe any cost- or time-saving measures put in place in attempting to bring the project as far as possible in achieving its results within its programmed budget and (extended) time. It will also analyse how delays, if any, have affected project execution, costs and effectiveness. Wherever possible, costs and time over results ratios of the project will be compared with that of other similar interventions. The evaluation will give special attention to efforts by the project teams to make use of / build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. to increase project efficiency all within the context of project execution in Indonesia.

## F. Factors and processes affecting project performance

55. **Preparation and readiness.** This criterion focusses on the quality of project design and preparation. Were project stakeholders<sup>110</sup> adequately identified? Were the project's objectives and components clear, practicable and feasible within its timeframe? Were the capacities of executing agencies properly considered when the project was designed? Was the project document clear and realistic to enable effective and efficient implementation? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project implementation? Were counterpart resources (funding, staff, and facilities) and enabling legislation assured? Were adequate project management arrangements in place? Were lessons from other relevant projects properly incorporated in the project design? What factors influenced the quality-at-entry of the project design, choice of partners, allocation of financial resources etc.? Were GEF environmental and social safeguards considered when the project was designed<sup>111</sup>?

56. **Project implementation and management.** This includes an analysis of implementation approaches used by the project, its management framework, the project's adaptation to changing conditions (adaptive management), the performance of the implementation arrangements and partnerships, relevance of changes in project design, and overall performance of project management. The evaluation will:

- (a) Ascertain to what extent the project implementation mechanisms outlined in the project document have been followed and were effective in delivering project outputs and outcomes. Were pertinent adaptations made to the approaches originally proposed?
- (b) Evaluate the effectiveness and efficiency of project management by ITDP and how well the management was able to adapt to changes during the life of the project.
- (c) Assess the role and performance of the units and committees established and the project execution arrangements at all levels.
- (d) Assess the extent to which project management as well as City Government (including the City Council) responded to direction and guidance provided by the Steering Committee and UNEP supervision recommendations.
- (e) Identify operational and political / institutional problems and constraints that influenced the effective implementation of the project, and how the project partners tried to overcome these problems. How did the relationship between ITDP and the local executing agencies (above all, the Transportation Agency) develop?
- (f) Assess the extent to which MTE recommendations were followed in a timely manner.
- (g) Assess the extent to which the project implementation met GEF environmental and social safeguards requirements.

57. **Stakeholder participation and public awareness.** The term stakeholder should be considered in the broadest sense, encompassing project partners, government institutions, private interest groups, local communities etc. The TOC analysis should assist the evaluators in identifying the key stakeholders and their respective roles, capabilities and motivations in each step of the causal pathway from activities to achievement of outputs and outcomes to impact. The assessment will look at three related and often overlapping processes: (1) information dissemination between stakeholders, (2) consultation between stakeholders, and (3) active engagement of stakeholders in project decision making and activities. The evaluation will specifically assess:

- (a) the approach(es) used to identify and engage stakeholders in project design and implementation. What were the strengths and weaknesses of these approaches with respect to the project's objectives and the stakeholders' motivations and capacities? What was the achieved degree and effectiveness of collaboration and interactions between the various project partners and stakeholders during design and implementation of the project?

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<sup>110</sup> Stakeholders are the individuals, groups, institutions, or other bodies that have an interest or stake in the outcome of the project. The term also applies to those potentially adversely affected by the project.

<sup>111</sup> <http://www.thegef.org/gef/node/4562>

- (b) the degree and effectiveness of any public awareness activities that were undertaken during the course of implementation of the project; or that are built into the assessment methods so that public awareness can be raised at the time the assessments will be conducted;
  - (c) how the results of the project (strategic programmes and plans, monitoring and management systems, sub-regional agreements etc.) promote participation of stakeholders, including users, in decision making in the transport sector.
58. **Country ownership and driven-ness.** The evaluation will assess the performance of government agencies involved in the project, the Government of Jakarta in particular, but also the national Government as relevant:
- (a) In how far has the Government assumed responsibility for the project and provided adequate support to project execution, including the degree of cooperation received from the various public institutions involved in the project and the timeliness of provision of counter-part funding to project activities?
  - (b) To what extent has the political and institutional framework of Indonesia been conducive to project performance?
  - (c) To what extent have the public entities promoted the participation of transport facility users and their non-governmental organisations in the project?
  - (d) How responsive were the government partners to ITDP coordination and guidance, and to UNEP supervision?
59. **Financial planning and management.** Evaluation of financial planning requires assessment of the quality and effectiveness of financial planning and control of financial resources throughout the project's lifetime. The assessment will look at actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co-financing. The evaluation will:
- (a) Verify the application of proper standards (clarity, transparency, audit etc.) and timeliness of financial planning, management and reporting to ensure that sufficient and timely financial resources were available to the project and its partners;
  - (b) Appreciate other administrative processes such as recruitment of staff, procurement of goods and services (including consultants), preparation and negotiation of cooperation agreements etc. to the extent that these might have influenced project performance;
  - (c) Present to what extent co-financing has materialized as expected at project approval (see Table 1). Report country co-financing to the project overall, and to support project activities at the national level in particular. The evaluation will provide a breakdown of final actual costs and co-financing for the different project components (see tables in Annex 3).
  - (d) Describe the resources the project has leveraged since inception and indicate how these resources are contributing to the project's ultimate objective. Leveraged resources are additional resources—beyond those committed to the project itself at the time of approval—that are mobilized later as a direct result of the project. Leveraged resources can be financial or in-kind and they may be from other donors, NGO's, foundations, governments, communities or the private sector.
60. Analyse the effects on project performance of any irregularities in procurement, use of financial resources and human resource management, and the measures taken by ITDP or UNEP to prevent such irregularities in the future. Appreciate whether the measures taken were adequate.
61. **UNEP supervision and backstopping.** The purpose of supervision is to verify the quality and timeliness of project execution in terms of finances, administration and achievement of outputs and outcomes, in order to identify and recommend ways to deal with problems which arise during project execution. Such problems may be related to project management but may also involve technical/institutional substantive issues in which UNEP has a major contribution to make. The evaluators should assess the effectiveness of supervision and administrative and financial support provided by UNEP including:
- (a) The adequacy of project supervision plans, inputs and processes;
  - (b) The emphasis given to outcome monitoring (results-based project management);
  - (c) The realism and candour of project reporting and ratings (i.e. are PIR ratings an accurate reflection of the project realities and risks);

- (d) The quality of documentation of project supervision activities; and
- (e) Financial, administrative and other fiduciary aspects of project implementation supervision.

62. **Monitoring and evaluation.** The evaluation will include an assessment of the quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The evaluation will appreciate how information generated by the M&E system during project implementation was used to adapt and improve project execution, achievement of outcomes and ensuring sustainability. M&E is assessed on three levels:

- (a) *M&E Design.* Projects should have sound M&E plans to monitor results and track progress towards achieving project objectives. An M&E plan should include a baseline (including data, methodology, etc.), SMART indicators and data analysis systems, and evaluation studies at specific times to assess results. The time frame for various M&E activities and standards for outputs should have been specified. The evaluators should use the following questions to help assess the M&E design aspects:
  - Quality of the project logframe (original and possible updates) as a planning and monitoring instrument; analyse, compare and verify correspondence between the original logframe in the Project Document, possible revised logframes and the logframe used in Project Implementation Review reports to report progress towards achieving project objectives;
  - SMART-ness of indicators: Are there specific indicators in the logframe for each of the project objectives? Are the indicators measurable, attainable (realistic) and relevant to the objectives? Are the indicators time-bound?
  - Adequacy of baseline information: To what extent has baseline information on performance indicators been collected and presented in a clear manner? Was the methodology for the baseline data collection explicit and reliable?
  - Arrangements for monitoring: Have the responsibilities for M&E activities been clearly defined? Were the data sources and data collection instruments appropriate? Was the frequency of various monitoring activities specified and adequate? In how far were project users involved in monitoring?
  - Arrangements for evaluation: Have specific targets been specified for project outputs? Has the desired level of achievement been specified for all indicators of objectives and outcomes? Were there adequate provisions in the legal instruments binding project partners to fully collaborate in evaluations?
  - Budgeting and funding for M&E activities: Determine whether support for M&E was budgeted adequately and was funded in a timely fashion during implementation.
- (b) *M&E Plan Implementation.* The evaluation will verify that:
  - the M&E system was operational and facilitated timely tracking of results and progress towards projects objectives throughout the project implementation period;
  - annual project reports and Progress Implementation Review (PIR) reports were complete, accurate and with well justified ratings;
  - the information provided by the M&E system was used during the project to improve project performance and to adapt to changing needs.

## G. Complementarities with UNEP strategies and programmes

63. UNEP aims to undertake GEF funded projects that are aligned with its own strategies. The evaluation should present a brief narrative on the following issues:

- (a) *Linkage to UNEP's Expected Accomplishments and POW 2010-2011.* The UNEP MTS specifies desired results in six thematic focal areas. The desired results are termed Expected Accomplishments. Using the completed ROI analysis, the evaluation should comment on whether the project makes a tangible contribution to any of the Expected Accomplishments specified in

the UNEP MTS. The magnitude and extent of any contributions and the causal linkages should be fully described. Whilst it is recognised that UNEP GEF projects designed prior to the production of the UNEP Medium Term Strategy 2010-2013 (MTS)<sup>112</sup> would not necessarily be aligned with the Expected Accomplishments articulated in those documents, complementarities may still exist and it is still useful to know whether these projects remain aligned to the current MTS.

- (b) *Alignment with the Bali Strategic Plan (BSP)*<sup>113</sup>. The outcomes and achievements of the project should be briefly discussed in relation to the objectives of the UNEP BSP.
- (c) *Gender*. Ascertain to what extent project design, implementation and monitoring have taken into consideration: (i) possible gender inequalities in access to and the control over natural resources; (ii) specific vulnerabilities of women and children to environmental degradation or disasters; and (iii) the role of women in mitigating or adapting to environmental changes and engaging in environmental protection and rehabilitation. Appreciate whether the intervention is likely to have any lasting differential impacts on gender equality and the relationship between women and the environment. To what extent do unresolved gender inequalities affect sustainability of project benefits?
- (d) *South-South Cooperation*. This is regarded as the exchange of resources, technology, and knowledge between developing countries. Briefly describe any aspects of the project that could be considered as examples of South-South Cooperation.

## 5. The Consultants' Team

64. For this evaluation, the evaluation team will consist of one team leader and one supporting consultant. Both consultants should have experience in project evaluation, planning and modernizing municipal transport systems including BRT and NMT in similar countries and be fluent in English. The supporting consultant, at least, needs to be fluent in Bahasa Indonesia. The Team Leader will coordinate data collection and analysis, and the preparation of the main report for the evaluation, with substantive contributions by the supporting consultant. Both consultants will ensure together that all evaluation criteria are adequately covered. In case the Team Leader does not speak/read Bahasa Indonesia, (s)he will be assisted by an interpreter/translator when required.

65. By undersigning the service contract with UNEP/UNON, the consultants certify that they have not been associated with the design and implementation of the project in any way which may jeopardize their independence and impartiality towards project achievements and project partner performance. In addition, they will not have any future interests (within six months after completion of the contract) with the project's executing or implementing units.

## 6. Evaluation Deliverables and Review Procedures

66. The evaluation team will prepare an **inception report** (see Annex 1 of TORs for Inception Report outline) containing a thorough review of the project context, project design quality, a draft reconstructed Theory of Change of the project, the evaluation framework and a tentative evaluation schedule.

67. The review of design quality will cover the following aspects (see Annex 7 for the detailed project design assessment matrix):

- Strategic relevance of the project
- Preparation and readiness (see paragraph 55);
- Financial planning (see paragraph 59);
- M&E design (see paragraph 62(a));
- Complementarities with UNEP strategies and programmes (see paragraph 63);
- Sustainability considerations and measures planned to promote replication and upscaling (see paragraphs 50-53).

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<sup>112</sup> <http://www.unep.org/PDF/FinalMTSGCSS-X-8.pdf>

<sup>113</sup> <http://www.unep.org/GC/GC23/documents/GC23-6-add-1.pdf>

68. The inception report will also present a draft, desk-based reconstructed Theory of Change of the project. It is vital to reconstruct the ToC *before* the most of the data collection (review of reports, in-depth interviews, observations on the ground etc.) is done, because the ToC will define which direct outcomes, drivers and assumptions of the project need to be assessed and measured to allow adequate data collection for the evaluation of project effectiveness, likelihood of impact and sustainability.
69. The evaluation framework will present in further detail the evaluation questions under each criterion with their respective indicators and data sources. The evaluation framework should summarize the information available from project documentation against each of the main evaluation parameters. Any gaps in information should be identified and methods for additional data collection, verification and analysis should be specified.
70. The inception report will also present a tentative schedule for the overall evaluation process, including a draft programme for the country visit and tentative list of people/institutions to be interviewed.
71. The inception report will be submitted for review and approval by the Evaluation Office before the evaluation team travels to Indonesia.
72. **The main evaluation report** should be brief (no longer than 35 pages – excluding the executive summary and annexes), to the point and written in plain English. The evaluation team will deliver a high quality report in English by the end of the assignment. The team will also provide the executive summary and the conclusions, lessons learned and recommendations section in Bahasa Indonesia (for the City Government of Jakarta). The report will follow the annotated Table of Contents outlined in Annex 1. It must explain the purpose of the evaluation, exactly what was evaluated and the methods used (with their limitations). The report will present evidence-based and balanced findings, consequent conclusions, lessons and recommendations, which will be cross-referenced to each other. The report should be presented in a way that makes the information accessible and comprehensible. Any dissident views in response to evaluation findings will be appended in footnote or annex as appropriate. To avoid repetitions in the report, the authors will use numbered paragraphs and make cross-references where possible.
73. **Review of the draft evaluation report.** The evaluation team will submit the zero draft report latest two weeks after the country visit has been completed to the UNEP EO and revise the draft following the comments and suggestions made by the EO. Once a draft of adequate quality has been accepted, the EO will share this first draft report with the UNEP Task Manager, who will ensure that the report does not contain any blatant factual errors. The UNEP Task Manager will then forward the first draft report to the other project stakeholders, in particular ITDP and the City Government of Jakarta for review and comments. Stakeholders may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. It is also very important that stakeholders provide feedback on the proposed recommendations and lessons. Comments would be expected within two weeks after the draft report has been shared. Any comments or responses to the draft report will be sent to the UNEP EO for collation. The EO will provide the comments to the evaluation team for consideration in preparing the final draft report.
74. The evaluation team will submit the final draft report no later than 2 weeks after reception of stakeholder comments. The team will prepare a **response to comments**, listing those comments not or only partially accepted by them that could therefore not or only partially be accommodated in the final report. They will explain why those comments have not or only partially been accepted, providing evidence as required. This response to comments will be shared by the EO with the interested stakeholders to ensure full transparency.
75. Submission of the final Terminal Evaluation report. The final report shall be submitted by Email to the Head of the Evaluation Office, who will share the report with the Director, UNEP/GEF Coordination Office and the UNEP/DTIE Task Manager. The Evaluation Office will also transmit the final report to the GEF Evaluation Office.
76. The final evaluation report will be published on the UNEP Evaluation Office web-site [www.unep.org/eou](http://www.unep.org/eou). Subsequently, the report will be sent to the GEF Office of Evaluation for their review, appraisal and inclusion on the GEF website.
77. As per usual practice, the UNEP EO will prepare a **quality assessment** of the zero draft and final draft report, which is a tool for providing structured feedback to the evaluation consultants. The quality of the report will be assessed and rated against both GEF and UNEP criteria as presented in Annex 2.

78. The UNEP Evaluation Office will also prepare a **commentary** on the final evaluation report, which presents the EO ratings of the project based on a careful review of the evidence collated by the evaluation consultant and the internal consistency of the report. These ratings are the final ratings that the UNEP Evaluation Office will submit to the GEF Office of Evaluation.

## 7. Logistical arrangement

79. This Terminal Evaluation will be undertaken by an independent evaluation consultants contracted by the UNEP Evaluation Office. The consultants will work under the overall responsibility of the UNEP Evaluation Office and will consult with the EO on any procedural and methodological matters related to the evaluation. It is, however, the consultants' individual responsibility to arrange for their travel, visa, obtain documentary evidence, plan meetings with stakeholders, organize field visits, and any other logistical matters related to the assignment. The UNEP Task Manager and ITDP will, where possible, provide logistical support (introductions, meetings, transport, lodging etc.) for the country visit, allowing the consultants to conduct the evaluation as efficiently and independently as possible.

## Annex 13: Brief CVs of the Consultants

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<b>Name:</b>	Philip John SAYEG		
<b>Date of birth:</b>	2 January 1954		
<b>Nationality:</b>	Australia		
<b>Qualifications:</b>	Bachelor of Civil Engineering, University of Queensland, 1975		
	Master of Urban and Regional Planning, University of Queensland, 1981		
	Graduate Diploma in Management (Technology Management), Deakin University/ Association of Professional Engineers and Scientists 1999.		
<b>Professional affiliations:</b>	Chartered Engineer, Engineers Australia		
<b>Years of experience:</b>	38		
<b>Areas of expertise:</b>	<ul style="list-style-type: none"> <li>• Urban and regional transport strategy, policy, institutional analysis, land use integration</li> <li>• Energy, environmental and CO2 emission impacts of transport</li> <li>• Business Case – technical &amp; economic evaluation of transport infrastructure &amp; services</li> <li>• Evaluation methodologies: economic, multi-criteria analysis, cost-effectiveness, logical framework, results measurement</li> </ul>		
<b>Countries of work experience:</b>	Australia, Ethiopia, Bangladesh, Cambodia, China including Hong Kong, Fiji, Indonesia, India, Japan, Laos, Malaysia, Myanmar, New Zealand, Philippines, Samoa, Solomon Islands, Singapore, Tanzania, Tonga, Thailand, Vietnam		
<b>Employment:</b>	January 1995 to Present	Managing Director, Policy Appraisal Services Pty Ltd, Brisbane, Australia	January 1995 to Present
		Director, PASCO Ltd., Bangkok, Thailand	From December 1992 to December 1994
		PPK Consultants, Australia, rose through various positions to become Principal (and one of 20 shareholders of the firm), Queensland and latterly, Thailand (mid-1989-1992)).	From July 1980 To November 1992
		Senior Planner, Metropolitan Transit Authority, Queensland	From November 1979 to June 1980
		PPK Consultants Pty. Ltd. (then Pak-Poy and Associates	From 1976 To 1979
		University of Queensland, Research Officer	1975 – August to December

Philip Sayeg holds degrees in engineering, planning and management and has 37 years of managerial and technical experience in urban and regional multi-modal transport and associated environmental matters in Australasia, the Pacific, Asia, and Africa. His career has encompassed every aspect of regional and urban transport planning and management from strategy formulation, to policy analysis, tactical planning and management, and comprehensive transport modelling and economic evaluation of water transport, aviation, rail/ light rail, bus, active transport, road and traffic management projects and their integration with land use/ environment. Having completed over 100 missions as a staff consultant for World Bank, International Finance Corporation, Asian Development Bank, German International Cooperation and AusAid since 1990, he is well known as a transport specialist.

He has undertaken senior advisory assignments for governments in Australia, Asia, Africa and the Pacific as well as in-house development of knowledge materials for World Bank, ADB and GIZ. These have included: (i) review of progress with ADB's urban transport operations as part of their Sustainable Transport Initiative 2013; (ii) climate change economics for Asian Development Bank's current sustainable urban transport projects in Hanoi and Ho Chi Minh City, Vietnam 2012/13; (iii) development of Clean Air Plans for several ASEAN cities for GIZ 2009-2012, (iv) post evaluation of South East Busway, Brisbane, Australia for Queensland Transport 2005; (v) due diligence of Bangkok BRT for World Bank 2008; (vi) phase-out of leaded gasoline in Ethiopia for World Bank 2002; and (vii) implementation completion review of 10 year Lao PDR road maintenance project for World Bank, 2010.

Relevant publications include:

- Valuing externalities of Bangkok's mass transit (Skytrain) system Paper presented at 25th Australasian Transport Research Forum, 2002. Co-author, David Bray.
- Intelligent Transport Systems (2005 and 2009). Co-author Prof. Philip Charles. Module 4E of GIZ's Sustainable Transport Source Book.
- Private sector involvement in urban metros: experience and lessons from South East Asia. Research in Transportation Economics THREDBO 12: Recent developments in the reform of land passenger transport, 39(1), 191-201. Bray, D. J. and Sayeg, P. J. (2013).
- Estimating changes in emissions from bus rapid transit: making best use of transport sector experience. WIREs Energy Environment. doi: 10.1002/wene.27. Sayeg, P. and Bray, D. (2012).
- Green Transport Policy: Directions for improved freight and passenger travel outcomes, with lower energy use and emissions (lead author). Prepared for World Bank. 2013.

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Harun al-Rasyid Lubis, fifty two years old, is Associate Professor at ITB. He was born in Medan, North Sumatera, Indonesia and obtained the degree B.Sc (Eng.) Civil Eng. from ITB, MSc.(Eng) Transport Planning & Engineering and Ph.D from Institute for Transport Studies, University of Leeds, UK. In 2001 he was Head of Transportation & Communication Research Center and in 2003 was Director of R & D on Infrastructure and the Region in ITB.

He has thirty years of professional experience, most of it in academic, research activities and consultancies. He worked widely in Indonesia as consultant to many public institutions and state-owned companies in Indonesia, also ADB, INDII and the World Bank in the area of transport policy, planning, operations, finance and institutions, covering both urban and national transport. He has been involved in review of private sector involvement in urban bus and rail systems as well as seaports. In 2008 to 2010 he was a technical member and resource person for Indonesia Railway Revitalization Team, under Coordinating Minister of Economics Affairs, also a member of National Research Council on Transportation in the Ministry of Research and Technology. In 2012 to 2013 he was a member in the Committee for Investment and Business Risk of PT Jasa Marga (Persero) Tbk (Indonesia Toll Road Corporation).

He currently serves as Head of Civil Engineering Postgraduate Program (Master and Doctoral) in the Faculty of Civil and Environmental Engineering ITB and Chairman of Infrastructure Partnership and Knowledge Center (IPKC) a not-for-profit think tank for infrastructure development. He is also a member of Professional Board of Indonesia Transport Society.

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