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Sustainable Urban Transport Programme

OWNER ESTIMATE FOR URBAN BUS SERVICES

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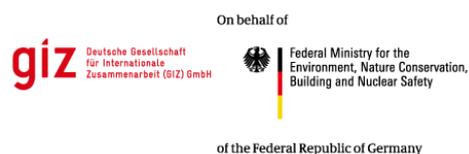
Ministry of Transportation
Republic of Indonesia
Directorate General of Land Transportation

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Owner Estimate for Urban Bus Services

A guideline for service providers/operators

2020



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EXECUTIVE SUMMARY

The Government of Indonesia, through the Ministry of Transportation, has committed to provide support and assistance in the development of public transportation systems in all cities in Indonesia. It aims to provide incentives to local governments to immediately take the necessary actions to help accelerate public transport reform in their respective cities. To realize this, the calculation of vehicle operating costs (BOK) needed as an indicator of determining minimum tariffs or providing subsidies.

The commonly used calculation methods in the calculation of vehicle operating costs refer to the Decree of Directorate General of Land Transportation and Transjakarta's calculation methods. Each of those calculation methods have advantages and disadvantages. The Decree of Directorate General of Land Transportation's method has advantages in the right understanding of the calculation component. In contrast, Transjakarta's method has advantages in practical worksheets and can provide comprehensive information. These conditions make the development of the BOK calculation model combine the advantages of each BOK calculation.

The components used in the BOK calculation differ in each region because of the diverse characteristics of the Indonesian region. Indonesian territory is dividing into three regions, namely west, central, and east, where each city also has its characteristics, so need price adjustments to the calculation component in each region. Furthermore, vehicle age components and vehicle specifications also determine the BOK calculation.

The development of the BOK calculation model divided into six worksheets, with one main worksheet integrated with three worksheets for data processing. There are also two other worksheets, a worksheet that contains a guide for users and a worksheet that contains bus specifications and the expense cost of the buses. On the main worksheets, the operator and the government can see the planned operating service targets, initial costs for investment, and costs needed during the full one-year operating period in the operation of urban public transportation. The route cost needs of urban public transport operations count through these

calculations. These costs have accommodated benefits for operators and taxes that must be paid by operators during urban public transport operations.

Prospective operators must have quality licensing so that they can fulfil urban public transport services following the planned operating service targets and minimum service standards (SPM). Furthermore, prospective operators must also prepare conditions in the tender process that have been set by the government. They must also have a strategy on how to provide competitive BOK offers following the provisions at a reasonable price but can carry out efficiency related to operational vehicle financing.

This guideline is an effort to assist the government in the supply and development of urban public transportation through a buy the service system. It will be elaborate on the BOK calculation process in the implementation of urban public transportation both for relevant authorities and for operators. Furthermore, it provides strategic steps so that operators can give their best offer to be involved in urban public transport operations.

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FOREWORD

Developing Guideline of Owner Estimate on Urban Bus Services aims to provide guidance for operators in calculating vehicle operating costs (BOK) in the organization of urban mass public transportation. The method of calculating BOK is based on literature from both the government and the private sector by considering the characteristics of cities in Indonesia. This model also provides information on the amount of initial investment costs and costs during operation and maintenance during the operation of urban mass public transportation. Furthermore, this guideline can also be a reference for the central and local governments in estimating the cost needs of urban public transport operations on a route.

This study expects to be a guideline for relevant stakeholders in planning the operational costs of urban mass public transportation, in order to provide full benefits to the public, especially users of transportation services.

Author

I. Review existing regulations for vehicle operating cost (BOK) calculations

Vehicle operating costs (BOK) are indicators used as a basis for determining minimum fares and providing subsidies. There are at least two guidelines for the calculation of BOK in the provision of urban public transport services, namely Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002 and SK.2412/AJ.206/DRJD/2008. Those regulations are guidelines for the central and local governments and the private sector in the implementation of mass transportation. However, local governments can make any adjustments through local regulation, such as the prevailing prices at the local level, because each region has a different price standard.

I.1. Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002, Guidelines for organizing urban public transportation on fixed and regular routes.

The proclamation of the directorate general of land transportation SK.687/AJ.206/DRJD/2002 is a guideline for organizing urban mass transport on fixed and regular routes. It aims as a guideline to those who may concern in operational planning of urban public transportation. The guideline requires all local authorities to evaluate the regulations of urban public transportation services and seeing opportunities to implement an urban public transportation route system. The guideline also regulates how to set services fare of urban public transportation based on vehicle necessary costs.

Fare of urban public transportations is the result of *multiplying the basic fare and the average distance (km) of one trip and adding 10% to the company's profit services*. Basic fare is the total expense to produce one unit of transportation service production unit. Basic fare calculates all components of the production costs of transportation services produces, namely **direct costs** and **indirect costs**.

1. **Direct costs**, costs related to the production of services and consist of fixed costs and variable costs.
2. **Indirect costs**, costs related to the indirect production of services and consist of fixed costs and variable costs.

Service production costs consist of direct costs and indirect costs with the components of the BOK calculation as follows.

Table 1 Components for calculating vehicle operating costs based on the Decree of the Directorate General of Land Transportation

No	Category	Component	Detail
1	Vehicle	Type	
		Services	
		Load capacity	
2	Production per bus	Mileage per trip (km)	
		Frequencies per day	
		Mileage per day	
		Passenger per trip	
		Passenger per day	
		Operational days per month	
		Mileage per month	
		Mileage per year	
		Seat.km per trip	
		Seat.km per day	
		Seat.km per month	
		Seat.km per year	
Direct costs			
1	Depreciation of productive vehicles	Vehicle price	
		Shrinkage period	
		Residual value	
		Per seat-km	
2	Productive vehicle capital interest	Interest rate per year	
		Capital interest per seat-km	
3	Bus crew per year	Vehicle crewmembers per bus	Driver
			Conductor
		Wages and fringes benefits	Wages
			Official travel money
			Fringe benefits
			Vehicle crewmembers' expense per year
	Vehicle crewmembers' expense per seat-km		
4	Fuel	Fuel consumption (liter)	
		Fuel consumption	
		Fuel prices per liter	
		Fuel prices per bus per day	
		Fuel prices per seat seat-km	

No	Category	Component	Detail
5	Tires and tubes	Tires consumption per bus	
		Tire durability (km)	
		Tire price per piece	
		Tire price per bus	
		Tire price per seat-km	
6	Minor vehicle maintenance (per 5.000 km)	Material costs	Machine oil
			Axle oil
			Transmission oil
			Grease oil
		Service fee	
		Maintenance costs	
	Maintenance costs per seat-km		
7	Major vehicle maintenance (per 15.000 km)	Material costs	Machine oil
			Axle oil
			Transmission oil
			Grease oil
			Brake fluid
			Oil filter
			Air filter
		others	
		Service fee	
		Maintenance costs	
	Maintenance costs per seat-km		
8	Overhaul	Engine overhaul (per 300.000 km)	Overhaul expense
			Costs per seat-km
		Body overhaul (per 360.000 km)	Overhaul expense
			Costs per seat-km
9	Additional engine oil	Additional per day	
		Oil price per liter	
		Cost for additional oil per day	
		Costs per seat-km	
10	Bus cleaning	Washing costs per day	
		Costs per seat-km	
11	Spare parts	Spare part costs	
		Costs per seat-km	
12	Terminal charges	SPE per day per bus	
		SPE per seat-km	
13	Vehicle tax	Tax per bus per year	
		Tax per seat-km	

No	Category	Component	Detail
14	Vehicle periodic test	Test per bus per year (twice a year)	
		Costs per test	
		Costs per bus per year	
		Costs per seat-km	
15	Insurance	Insurance costs per bus per year	
		Insurance costs per seat-km	
Indirect costs			
1	Administrative expense	Administrative crewmembers	Director
			Administration and finance
			Operational
			Engineering
		Wages and fringes benefits	Wages
			Official travel expense
			Fringe benefits
Crewmembers' costs per year			
Crewmembers' costs per passenger			
2	Management expense	Depreciation of office building	Depreciation per year
		Depreciation of pool and garage	Depreciation per year
		Depreciation of utilities	Depreciation per year
		Depreciation of garage equipment	Depreciation per year
		Office, garage and pool maintenance expense	
		Office administration expense per year	
		Electricity and water expense per year	
		Official travel expense per year	
		Property tax	
		Company tax	
		Route clearance	
		others	
		Total management expense per year	

No	Category	Component	Detail
		Total management expense per passenger	

Source: Ministry of Transportation, 2002 and 2008

I.2. Decree of the Directorate General of Land Transportation SK.2412/AJ.206/DRJD/2008 Guidelines for the provision of urban public transport subsidies on the road

The proclamation of the directorate general of land transportation SK.2412/AJ.206/DRJD/2008 is a guideline for the provision of public transportation subsidies on the road. It aims as a guideline to those who may concern in operational planning of urban public transportation in providing subsidies. While it guides how to calculate subsidies expense for urban public transport, it refers to the Decree of the directorate general of land transportation SK.687/AJ.206/DRJD/2002. The calculation of basic fare applies to the previous decree as it used to calculate subsidies expense for urban public transport.

The calculation of subsidies on this decree also attaches a template of basic fare formulation that should be on previous decree (SK.687/AJ.206/DRJD/2002). The worksheet of basic fare is a formula used by the urban public transportation operator, whether carried out by central or local governments. In the next section, we will discuss how the Governor of Sumatera Utara provides the formula of calculation of operational costs through his authority based on 2002's decree with basic fare formulation on 2008's order. Moreover, the next section will discuss the local regulation of DKI Jakarta about bus rapid transit management systems.

I.3. Governor of Sumatera Utara Regulation No. 31 of 2014, road-based public transport services in the urban area of Medan, Binjai and Deli Serdang

The government of Sumatera Utara, through the governor, had provided road-based public transport services in the urban area of Medan, Binjai, and Deli Serdang by gubernatorial regulation. It aims to serve the economic activities in Sumatera Utara as one of the National Strategic Area (KSN). As one of KSN, mobility

is inevitable in the urban area of Medan, Binjai, and Deli Serdang (Mebidang) because people need to move to fulfil their activities in urban areas.

The gubernatorial regulation provides calculation sheet of the basic fare template based on SK.2412/AJ.206/DRJD/2008 attachments. All components of basic fare calculation on SK.687/AJ.206/DRJD/2002 accommodated on its regulation. Nevertheless, there are adjustments to several calculation components in the operation cost calculation sheet, such as the calculation of cost per kilometre recapitulation.

I.4. Regional regulation of DKI Jakarta No. 10 of 2014, bus rapid transit system management

According to the regional regulation stated that the Governor of DKI Jakarta is responsible for managing the BRT system. These responsibilities include planning, building, developing the BRT system, and establishing financial support so that BRT service fares remain affordable for the community. The BRT operation is carried out by the BRT business entity, namely PT. Transportasi Jakarta. PT. Transportasi Jakarta (Transjakarta) is local-owned corporations, locally known as Badan Usaha Milik Daerah (BUMD), who responded to the governor of DKI Jakarta, which means Transjakarta must implement the applicable regulations in DKI Jakarta.

At present, Transjakarta has served at least 13 corridors with feeder transportation to integrate its services. To support the operation of Transjakarta, DKI government is responsible for providing subsidies to Transjakarta. Subsidies are state in Governor of DKI Jakarta Regulation No. 62 of 2016. The regulation is a consequence of the service fare set by the governor based on Regional regulation of DKI Jakarta No. 10 of 2014. The subsidy policy is an operational subsidy that adjust to the amount of the BRT system service fare adjustment.

Meanwhile, the operator is holding the operation of the bus on each service route. A cooperation agreement between Transjakarta and the operator make it done. In that agreement, the operator must carry out the minimum service standards (SPM) set by the Governor and the price of rupiah per kilometre. The price of rupiah per kilometre (Rp/km) is determined based on the components of

operational calculation, maintenance, overhead, operating profit, taxes, and investment in transportation procurement. As for the adjustment to Rp/km done by considering three factors, namely fuel prices, the provincial minimum wage amount, and annual inflation calculations.

II. Comparison of vehicle operating cost (BOK) regulations

Public transport operations refer to regulations issued by the Ministry of Transportation in particular through the Directorate General of Land Transportation. However, local government can make adjustments specifically related to the unit price applicable in their respective regions on public transport operations. The two regulations that form the basis of public transport operations are complementary. Moreover, the following is a comparative analysis matrix of the calculation of operational public transport costs.

Table 2 Comparison between the decree of 2002 and 2008

SK.687/AJ.206/DRJD/2002	SK.2412/AJ.206/DRJD/2008	Comparison
Objectives		
As a guide to whom may concern the planning or urban public transportation.	As a guide to whom may concern the provision of public transportation subsidies on the road.	Both of them have different goals, but they are complementary. The 2002's decree is the basis for calculating urban public transportation, and the 2008's order has purposes as a guideline for the provision of subsidies for urban public transportation based on calculations using the 2002's decree.
Regulatory material		
Regulation of urban public transportation on fixed and regular routes guidelines	Guideline for provision of urban public transportation subsidies on the road	Both have different materials focus. In 2002's decree, the primary material discussed was the technical implementation of urban public transport. Meanwhile, in 2008's order, the primary content discussed was the professional guidelines for the provision of subsidies for urban public transportation.
The materials in it consist of basic fare calculation examples along with fare calculation formula.	The completeness of the material includes a form of calculation of necessary costs along with a formula for calculating subsidies given for public transportation.	The basic fare calculation form contained in the Decree of Directorate General of 2008 is the formulation of the technical guidelines provided in the Decree of the Directorate General of 2002 in the administration of urban public transport. Also, the Decree of Directorate General of 2008 includes a formula for calculating the number of subsidies given for urban public transport.

Source: Author, 2020

Based on the table, two decrees of the directorate general is complementary to the operation of urban public transportation. The Decree of the Directorate General of 2008 clearly explains the description and conditions set out in the Decree of the Directorate General of 2002. All forms of formulas that form part of the calculation of operational public transport costs explained in the Decree of the Directorate General of 2002 along with examples of cases in the Decree of the Directorate General. In line with the 2002 Directorate General's Decree, in 2008, another Directorate General's Decree complemented well how the formula for calculating the number of subsidies for public transport operations. Furthermore, it also explained the implementation of supervision, monitoring, and evaluation of public transport subsidies. Local governments that conduct public transportation must refer to the tow Decree of the Directorate General.

III. Literature review of vehicle operating cost (BOK) calculations

BOK calculation process seen by studies or application practices. The BOK calculation process will be use as a reference in determining fare or subsidies needed and determined on an implemented service. On the other hand, the BOK calculation based on studies will be conducted by referring to existing literature or guidelines and calculated using data obtained from survey results. The calculation process does not only refer to one source or guideline in calculating BOK.

III.1. Vehicle operating cost (BOK) calculation studies

Based on studies, several examples of the BOK calculation process, almost all the calculation processes refer to existing regulations. It relates to study or research that must be accountable so that most of them refer to applicable regulatory standards. Therefore, many of them in carrying out the calculation process refers to the Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002. Some of them used as a reference for the calculation process in several cities are as follows.

Table 3 Vehicle operating cost calculation studies

No	Title	Author	Published	Calculation reference
1	<i>Analisis Biaya Operasional Kendaraan (BOK) dan Tingkat Okupansi Angkutan Taksi Daerah Istimewa Yogyakarta</i>	Raden Aji Laksono, Imam Basuki, Y. Lulie	2015	The Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002
2	<i>Analisis Tarif Bus Rapid Transit (BRT) Trans Sarbagita Berdasarkan BOK, ATP dan WTP</i>	I Wayan Suweda & Kadek Arisena Wikarma	2012	The Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002
3	<i>Penentuan Operasional Jaringan Angkutan Umum di Kawasan Metropolitan Pontianak Berbasis BRT (Bus Rapid Transit)</i>	Haridan, Akhmadali, Heri Azwansyah	2018	The Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002

Source: Author, 2020

The calculation grouping in studies that have conducted will be analysed the amount of the fare charged to users of public transport services based on the associated cost components. Some assumptions that are applied to be able to determine vehicle operating cost uses the price assumptions that affect each region.

According to the Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002 about guidelines for organizing urban public transport on fixed and regular routes, vehicle cost per kilometre calculated by adding up the direct costs and indirect costs. The formula used to calculate vehicle operating costs in several studies that have done.

III.2. Vehicle operating cost (BOK) calculation implementations

The operation of urban public transport requires BOK calculations to determine the cost burden. There are at least two methods of calculation in public transport operations, namely calculations that refer to the Directorate General's Decree and Transjakarta's calculations. The calculation method that refers to the Decree of the Directorate General is Damri, Trans Semarang, Trans Jateng, and Trans Mebidang with the calculation components, as shown in **Table 1**. Meanwhile, Transjakarta has its calculation method by including calculation components, which are broadly the same as the Decree of the Directorate General. The component is also a calculation component used by Curitiba BRT.

A. Transjakarta

Transjakarta BOK calculation method prepared by considering the existing conditions of service coverage. Prospective operators invited to submit offers to become operators on routes that have been set by the Transjakarta management. One of the things that must include in submitting the offer is the burden of the BOK to serve the route. BOK calculations are prepared, taking into account the following components.

Table 4 Components for Transjakarta's vehicle operating cost calculations

No	Category	Component	Detail
1	Vehicle operating cost structure	Ideal number of buses per corridor (unit)	
		Number of reserve buses (unit)	
		Number of buses in operation (unit)	
		Number of operational days per bus per month (days)	
		Mileage per trip (km)	
		Deadhead distance (km)	
		Gas station – bus line distance (km)	
		Travel time one way (minutes)	
		Travel time one way (hours)	
		Average speed (km/hours)	
		Headway (minutes)	
		Travel time in 1 trip (minutes)	
		Number of buses (unit)	
		Mileage per bus per day (km)	
		Ideal mileage per day (km)	
		Number of operational days per year (days)	
		Number of ideal operational days per year (days)	
		Ideal mileage per year (km)	
		Mileage per year (km)	
Mileage/litre (km)			
General expense			
1	Bus price per unit (rupiah)		
2	Amount of investment in bus procurement per corridor (rupiah)		
3	Fixed interest rate (%) \approx equivalent to 17,5% interest rate decreased		
4	Depreciation period (year)		
5	Residual value (%)		
6	Residual price (rupiah)		
7	100% loan value for bus price (rupiah)		

No	Category	Component	Detail
8	Loan term (year)		
Investment costs			
1	Provision fees (legal admin) 2,5% bus price		
2	Total Loss Only (TLO) insurance per bus is 1,3% the price of the bus		
3	Depreciation value per bus per year		
4	Interest costs on capital per bus per year		
Operational and maintenance expense			
1	Operational and maintenance expense	Fuel consumption per bus per year	
		Maintenance and spare part costs per bus per year	
		Driver wages per bus per year	
		Mechanic wages per bus per year	
		Terminal charges per bus per year	
		Total operational expense per bus	
		Total operational expense per corridor	
2	Operational and maintenance overhead expense	Garage and pool crewmembers' expense per bus	
		Management and office crewmembers' expense per bus	
		Office operating expense per bus	
		Garage operating expense per bus	
		Tax and vehicle periodic test per bus	
		Pool and garage maintenance expense per bus	
		Depreciation of office and garage equipment per bus	
		Office equipment maintenance expense per bus	

Source: Transjakarta, unknown

B. Curitiba BRT

According to World Bank (2004), the fare policy set by BRT Curitiba succeeded in reducing the transportation cost allocation for low-income people

to only 10% of their total income. The policy is a flat fare and free transfer from feeder to trunks. It is undoubtedly compiled based on calculations by considering the following components.

Table 5 Components for Curitiba BRT's vehicle operating cost calculations

No	Category	Component
Operational costs		
1	Dependent costs	Fuel
		Lubricants
		Vehicle depreciation
2	Maintenance costs	Personnel
		Parts and accessories
3	Personnel costs	Drivers
		Conductors
		Supervisors
		Porters
		Uniform
Administrative costs		
1	Personnel	
2	Equipment depreciation	
3	Payments for equipment and installations	
4	Payments for garage and repairs	
5	Depreciation of buildings and infrastructure	
Capital costs		
1	Payments to private capital (1% of investments in new buses per month)	
2	Amortization of private capital (depreciation of the bus fleet)	

Source: World Bank, 2004

The BOK calculation can also be review from its implementation. There are at least three examples that used as a reference, namely Damri's BOK calculation and Transjakarta's BOK calculation, to determine the fares and subsidies that charged to the transportation users. Furthermore, the implementation of BRT in Curitiba also has a calculation component that is relatively similar to the BOK calculation in Indonesia.

Table 6 Vehicle operating cost (BOK) calculation implementations

No	Title	Author	Published	Calculation reference
1	<i>Perhitungan Biaya Operasional Kendaraan (BOK) DAMRI</i>	Raden Aji Laksono, Imam Basuki, Y. Lulie	2019	The Decree of the Directorate General of Land Transportation SK.2412/AJ.206/DRJD/2008
2	<i>Perhitungan Biaya Operasional Kendaraan (BOK) Trans Jakarta</i>	<ul style="list-style-type: none">• PT. Eka Sari Lorena• PT. Jakarta Megah Trans	2018	Its own method based on various literature
3	Innovative Urban Transport in Curitiba, Brazil	Roberto Santoro, Government of Parana; Josef Leitmann, World Bank	2004	Own method

Source: Author, 2020

Based on studies of the calculation process above, there are several essential points to consider in developing the BOK calculation.

1. The vehicle operating cost calculation activities by the Ministry of Transportation and Damri refer to the guideline of the Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002 and SK.2412/AJ.206/DRJD/2008. The main item of calculation divided into direct and indirect costs.
2. Transjakarta has its calculation method based on various literature. There are three items for it, namely general expense (1), investment expense (2), and operational and maintenance expenses (3).
3. BRT in Curitiba has a calculation component that is relatively similar to the BOK calculation on the Decree of Directorate General of Land Transportation and Transjakarta. However, Curitiba classifies these components into three categories, namely operational costs (1), administrative costs (2), and capital costs (3).
4. The BOK calculation components are components that affect operational costs to serve one route. Hence the component is a component that supports the performance of urban public transport services.
5. The price value of each calculation component will adjust to the prices prevailing in each region.

IV. Vehicle Operating Cost (BOK) calculating developments

Based on the policy studies, literature, and vehicle operating cost calculation implementations on public transport operations, there are several conclusions as follows.

1. Three main components can change the rupiah per kilometre (Rp/km) on BOK calculation in each region.

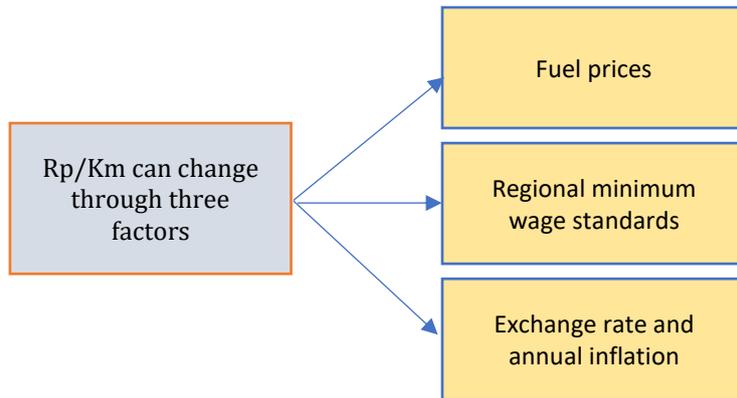
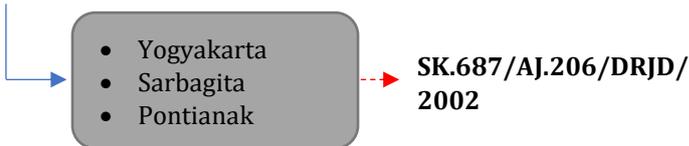


Figure 1 Independent components in rupiah per kilometer

2. Based on the policy review and literature review, there are inputs for the development of the BOK calculation as follows.

1. STUDIES



2. IMPLEMENTATIONS

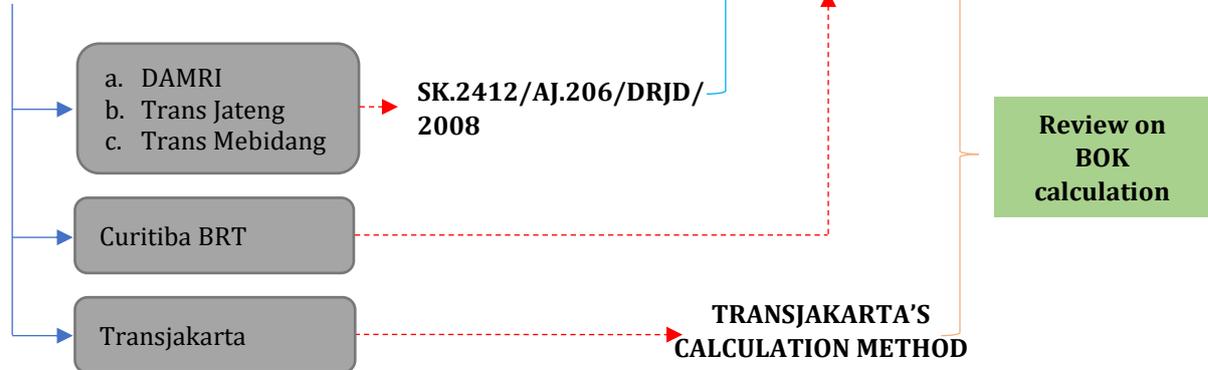


Figure 2 Literature review on urban public transport BOK calculations

3. The development of BOK calculation can accommodate the characteristics of each region with supporting assumptions through a user-friendly template as a guideline for relevant authorities and prospective operators in estimating operational costs of providing public transport services.
4. All components of BOK calculation need to be identified based on urban public transport service and minimum service standard plans for sustainable services.

The BOK calculation method is grouped into 2 (two) because Curitiba BRT is assumed to have the same calculation method as the decree of Director-General, and Transjakarta has its calculation method. It is due to the calculation component of Curitiba BRT in its BOK calculation. In general, Curitiba BRT has components similar to those owned by the Decree of the Director-General and Transjakarta. However, Transjakarta is not grouped into the same calculation method because it has its own BOK calculation method, even though the components used by Transjakarta are also relatively similar.

IV.1. Components for calculating vehicle operating costs based on the Decrees of the Directorate General of Land Transportation

The ministry of transportation, through the Directorate General of Land Transportation, regulates the BOK calculation methods in urban transport operations. SK.687/AJ.206/DRJD/2002 contain the calculation method, with an example of the calculation attached to SK.2412/AJ.206/DRJD/2008.

IV.2. Transjakarta's components for calculating vehicle operating costs

Transjakarta has a different BOK calculation method than the Directorate General's Decrees, both SK.687/AJ.206/DRJD/2002 and SK.2412/AJ.206/DRJD/2008. However, the calculation component used by Transjakarta is relatively similar to the calculation component in the decrees. Transjakarta arranged these components in more detail, then grouped them into several calculation worksheets to find out the BOK needed in one service route.

Transjakarta arranged these components in more detail, then grouped them into several calculation worksheets to find out the BOK in one service route.

IV.3. Curitiba BRT's components for calculating vehicle operating costs

Curitiba chose to use the bus as a public transportation with a dedicated-lane to fulfil the movement of the people because the costs must be far cheaper than using other modes of transportation. Moreover, it can also operate on existing road networks. The public transportation system in Curitiba developed its structural axis road system and carefully integrated it with land-use planning. Curitiba also makes affordable fares for bus users. One flat fare policy and allow passengers to transfer from feeder to trunk for free became one of the drivers of the success of Curitiba BRT. Those policies also succeeded in reducing the allocation of costs for transportation for low-income residents of Curitiba to spend only about 10% of their income on transport (World Bank, 2004).

The following is a matrix of calculation components owned by SK Dirjen, Transjakarta, and BRT Curitiba.

Table 7 Comparison matrix of BOK calculation components

No	Component	Decree	Transjakarta	Curitiba BRT
1	Fuel consumption	√	√	√
2	Oil lubricants	√	√	√
3	Vehicle depreciation	√	√	√
4	Capital interest	√	√	√
5	Wages and fringes (Drivers, administrative crew members, engineers, others)	√	√	√
6	Vehicle maintenance expense	√	√	-
7	Spare part expense	√	√	√
8	Terminal charges	√	√	-
9	Taxes and periodic vehicle tests	√	√	-
10	Office, garage, and pool operational expense	√	√	√
11	Depreciation of building	√	√	√
12	Depreciation of equipment	√	√	√
13	Building and equipment maintenance expense	√	√	√

Source: Author, 2020

Different calculation methods process the relatively same type of component. Differences in calculation methods for calculating vehicle operating costs occur at least between users of the Director General's Decree and Transjakarta. Some parties who use the calculation method in the Decree of the Director-General are Trans Jateng, Trans Mebidang, and Damri. Meanwhile, Transjakarta has its calculation method. The difference in the calculation is not a problem because the components involved in the calculation have in common with one another. The following is a comparison matrix between the calculation methods based on the Decree of the Director-General and Transjakarta.

Table 8 Comparison matrix of vehicle operating costs

Parameter	Decree		Transjakarta	
	Advantages	Disadvantages	Advantages	Disadvantages
Calculation worksheet	Calculation worksheets present simply and easily understood.	All calculations are in one sheet package, so they are not detailed.	There are several calculation worksheets with each sheet connected.	Complex calculation worksheets.
Calculation component	The calculation component accompanied by a breakdown of the costs and the formula used.	Operational Service Target calculations are not attached to the Decree of the Director-General, so the calculations are carried out separately without a template.	The calculation components presented in full with the costs and formulas used. Calculation of Operational Service Targets into one unit.	-
	The calculation components are grouping into two parts, namely direct costs, and indirect costs, so the calculation becomes simpler.	The form of grouping requires that the prospective operator perform calculations separately for the costs that need to be prepared and the calculation of the potential income to be received.	The calculation components are grouped into three parts, namely general costs, investment, and operational and maintenance, making it easier for prospective operators to know the cost requirements and profit potential.	These components interconnected with other worksheets, so users must clearly understand the parts that must be input.
	The calculation component uses the composition of officers in the bus and operational in detail.	There are no explicit assumptions in determining the number of bus and operational staff arrangements.	The calculation component uses the composition of officers on the bus and operational details and the assumptions used.	The types of variable salaries and allowances for bus and operational officers differ and require a multiplier coefficient when used for other regions.

Source: Author, 2020

A comparison between the methods of calculating vehicle operating costs of urban public transport shows that each method has advantages and disadvantages. However, there is no better and perfect method of calculation. A new vehicle operating cost calculation method concept can be prepared based on the findings of the comparison matrix. However, the new calculation method also will not reduce the basic guidelines that already exist in the Decree of the Directorate General. Furthermore, the next section will discuss the concept of this calculation method.

V. The new vehicle operating cost (BOK) calculation concepts

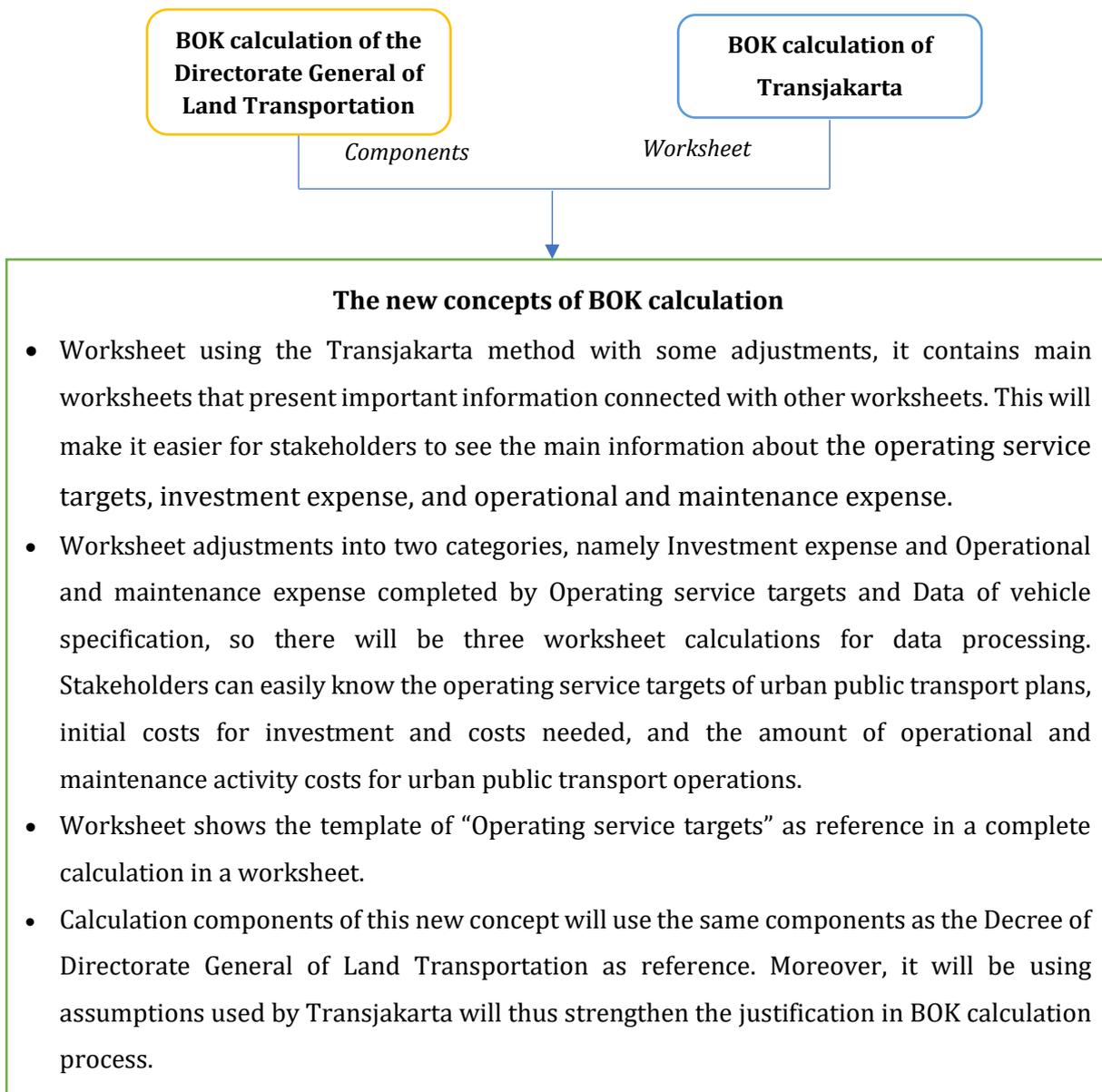
The new vehicle operating cost calculation concept is the result of a comparative analysis conducted in the previous section. The concept of this calculation aims to provide convenience for users, both government and prospective public transport operators. The Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002 is the basis for the preparation of this new calculation. However, Transjakarta's advantages calculations accommodated in this new calculation. The following are the points of concept in the new calculation.

- The new BOK calculation uses the calculation component contained in the Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002 because the components used by Transjakarta are very complex and require a long time to do input and evaluation of calculations;
- Component grouping made as in the Transjakarta's calculation. The changes in grouping start from direct and indirect costs to investment costs; and operator and maintenance costs. Components based on the decree adjusted to the two new groups to facilitate the process of calculation and evaluation compiled by relevant stakeholders. Also, this grouping will make the BOK calculation form friendly to users both government and prospective operators, so they can more easily estimate the value of the investment required, operational and maintenance costs that need to be prepared and the potential benefits to be gained; and
- The new calculation will accommodate the operating service targets mechanism so that the other calculations do not require other worksheets.

The new calculation component is taken from the Director General's Decree and added with the relevant calculation component and using relevant assumptions with current conditions. Completeness added to maintain the performance of urban public transport services. One of them is to provide health insurance and employment insurance in the category of operational and maintenance components. Meanwhile, the price reference used during the calculation process can take from

several sources. As for the source of the cost, reference can be either primary data or secondary data. For example, primary data can use as a basis for calculating bus prices, parts prices, daily allowances for drivers and officers, bus service costs, and others. In contrast, secondary data can use as a basis for calculations related to interest rates, regional minimum wages, fees, etcetera.

The plan to develop a new BOK calculation is to combine the advantages of each calculation method used as a reference so far. The advantages of each calculation method, as explained in the previous section, The Decree of the Director-General has completed and easy to understand components. In contrast, Transjakarta in the BOK calculation has a complete and systematic worksheet that can provide vital information to the government or prospective operators. Also, related to prices or costs associated with the study area will follow the characteristics of each region.



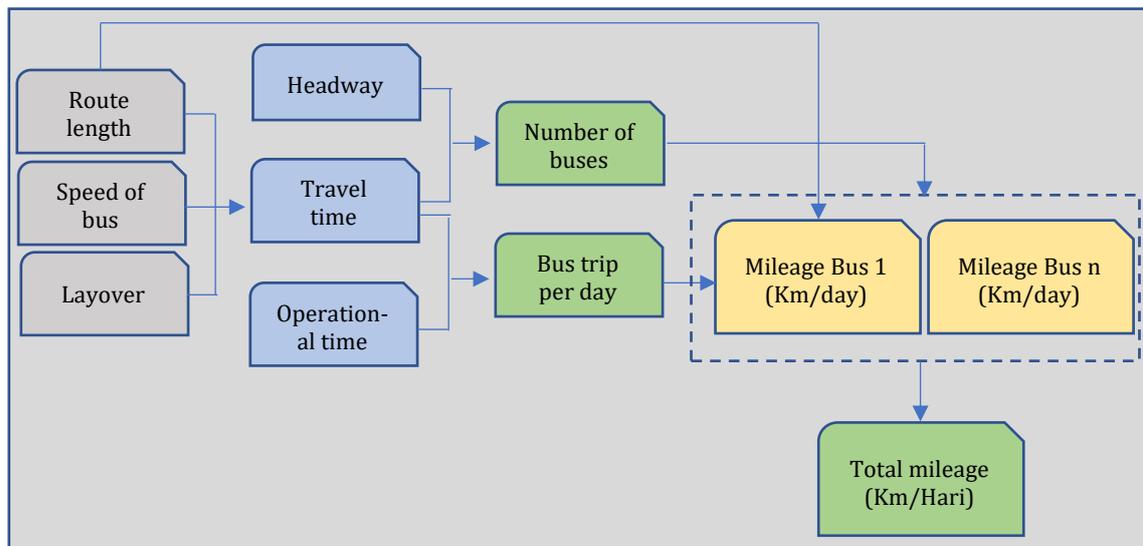
Source: Author, 2020

Figure 3 Scheme of the new BOK calculation planning by merging the Decree of the Directorate General and Transjakarta BOK calculation

VI. Vehicle operating cost (BOK) calculation stages

The vehicle operating cost calculation process can divide into three parts, namely primary and secondary data collection activities, analysis process, and calculation of vehicle operating costs. Data collection aims to determine the Production Target of Urban Public Transport Services. Then it will be analysed as input in the calculation process for the planned implementation of urban public transportation. The BOK calculation process of Transjakarta is way more evident rather than the decree. It shows how all components contain the calculation has interconnected in order to get the amount of BOK from a planned service. The following is a flowchart of the calculation process of urban public transport.

1. OPERATING SERVICE TARGETS



2. BOK CALCULATIONS

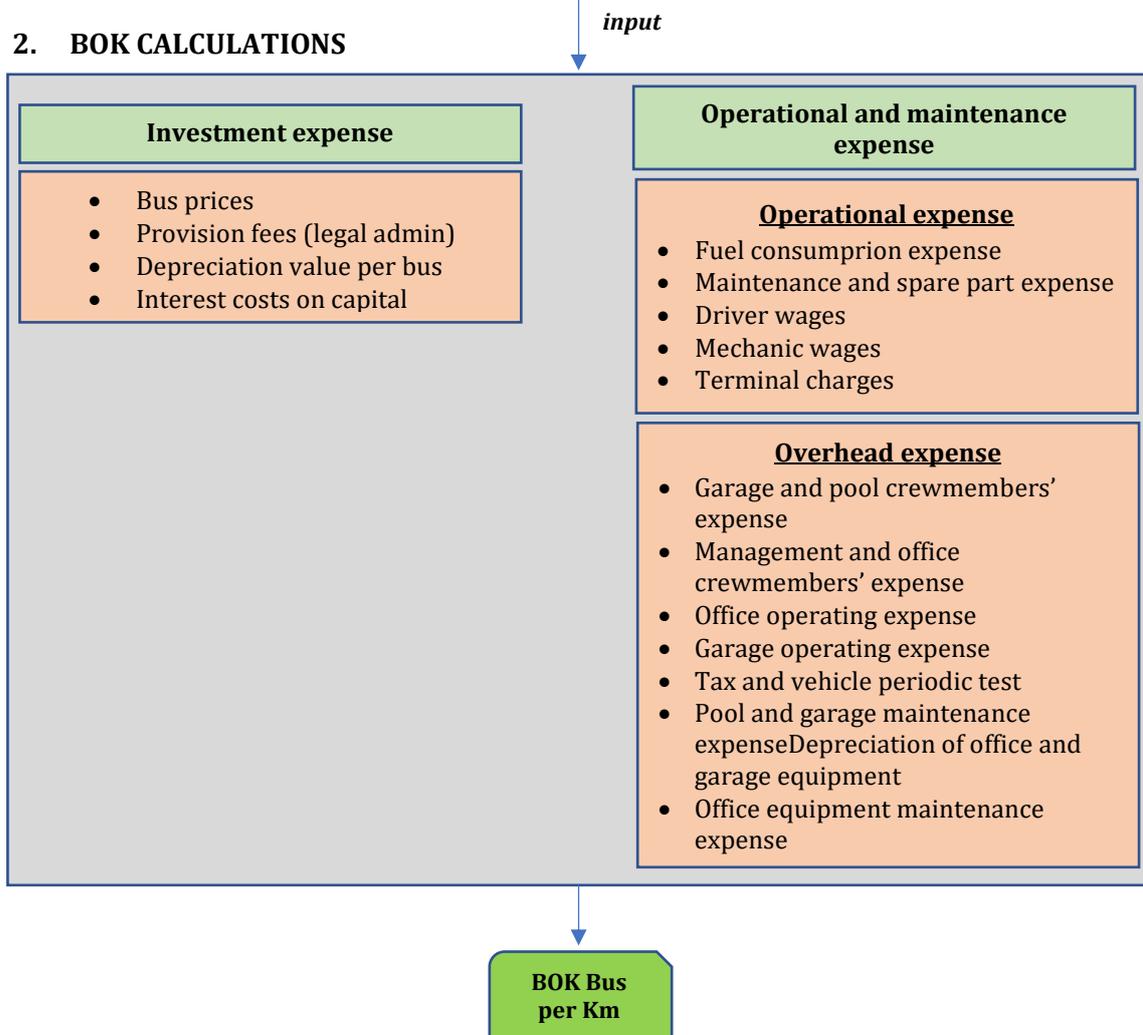


Figure 4 Flowchart of BOK calculation process for urban public transportation

In the prepared BOK calculation, consider several points. These points are related to the calculation process both before, during, and after in the process. Here are a few points to note.

- a. Operating service targets have to be clear and must use valid data because it will affect the results of the calculation;
- b. Standard operating procedure and minimum service standard (SPM) can control the results of the calculation if it is following the planned of operating service targets;
- c. The unit cost price in the different BOK calculations for each region will be left blank and given an assumption statement to be filled separately; and
- d. The unit price multiplier coefficient requires a separate study.

VII. Vehicle operating cost (BOK) development assumptions

The new BOK calculation formula is a calculation formula based on several case studies that have applied in Indonesia. In 2008, the BOK calculation compiled at a cost per passenger-kilometre. The calculation formula was a guideline used by Damri and several other urban public transportations found in several cities. However, nowadays, urban public transport has changed its calculation using the cost per bus-kilometre calculation (rupiah/bus-km). Trans Mebidang (Sumatera Utara), Trans Semarang, and Transjakarta are urban mass transportation that has used the cost per bus-kilometre calculation. This form of calculation makes it easy for the government and operators for urban mass transport operations. This facility enables the government to implement a buy service scheme. Several adjustments to the calculation formula follow changes in the BOK calculation unit.

Transjakarta's success in providing reliable services to its customers is not only related to the company's management and operational systems. The system of purchasing services used by Transjakarta has managed to maintain its excellent performance. This performance realized with the right bus conditions following minimum service standards set by the local government, and bus operators must implement it. Reliable operation can be accomplished with a proper vehicle operating cost calculation and achieve the operating service targets. Similar to the vehicle operating cost calculation, which refers to the decree of Director General of Land Transportation in 2008, the Transjakarta vehicle operating cost calculation also has advantages and disadvantages, as already mentioned in the previous section.

This new calculation formula classifies three categories of calculation components, namely moving service targets, investment, and operational and maintenance.

1. Operating service targets

Operating service targets are a group of components that contain conditions and conditions that must be carried out by operators when conducting urban mass transit services. In this section, elements include, the duration of operational time,

annual operational time in days units, speed average, mileage, the number of buses that have to serve the corridor along with reserve buses, and how many times each bus goes back and forth on the passage in one day.

Table 9 Assumption of operating service targets in BOK calculations

No	Description	Sample	Unit	Assumption
1	Operational time (hours)	16,0	Hours	Assumption plan
2	Route length	18,7	Km	Assumption plan
3	Monthly operational time	25,0	Days	Assumption plan
4	Time travel	56,0	Minutes	Assumption plan (not include <i>deadhead</i>)
5	Headway plan (H)	10,0	Minutes	Assumption plan
6	Number of stops	47,0	Unit	Assumption plan

Source: Author, 2020

2. Investment

Investment is a group of components containing costs that must be prepared by operators for the benefit of urban public transport. These components are depreciation costs, productive vehicle capital interest, Bus procurement budget is done to calculate the investment amount. The aims for investors or relevant stakeholders to obtain an overview of the initial investment needs in the operation of urban public transportation following the predetermined operating service target plans.

Table 10 Assumption of investment expense in BOK calculation

No	Description	Sample	Unit	Assumption
1	Bus prices	850.000.000	rupiah	Average price at bus distributor
2	Depreciation value per bus	5	year	Assumption of a contract plan
3	Interest rate per year	7%	percent	Based on applicable interest rates or not calculated if the bus is government assistance

Source: Author, 2020

3. Operational and Maintenance

Operational and maintenance is a group of components containing costs that must be incurred by the operator when performing urban public transport services.

These components are fuel consumption costs, support costs, and spare parts costs, driver and mechanical wages, all costs to be paid, management fees, garage and pool attendant, office operations, garage and pool, taxes and periodic tests vehicle, parking and pond maintenance costs, depreciation of office and garage equipment, and office equipment maintenance costs. The calculation method and type of component refers to the Decree of the Director-General.

Table 11 Assumption of operational and maintenance expense in BOK calculation

No	Description	Sample	Unit	Assumption
1	Fuel price per litre	5.150	rupiah	Diesel fuel
2	Machine oil price per litre	58.500	rupiah	Bus workshop survey
3	Axle oil price per litre	45.000	rupiah	Bus workshop survey
4	Transmission oil per litre	45.000	rupiah	Bus workshop survey
5	Grease oil price per kg	25.000	rupiah	Bus workshop survey
6	Service fee of minor vehicle maintenance	400.000	rupiah	Bus operator survey
7	Service fee of major vehicle maintenance	1.000.000	rupiah	Bus operator survey
8	Other expenses	1.500.000	rupiah	Bus workshop survey
9	Bus cleaning per day	30.000	rupiah	Bus operator survey
10	Tire price per piece	2.025.000	rupiah	GT Radial Super Tire survey
11	Driver's wages per month	2.004.000	rupiah	Minimum wages of Kota Yogyakarta 2020
12	Fringe benefits per month	80.000	rupiah	Adjustment of Kota Yogyakarta
13	Driver's uniform price per set	250.000	rupiah	Bus operator survey
14	Terminal charges per bus per year	600.000	rupiah	Local Regulation of DIY No. 4/2012
15	Rent expense of office buildings for five years	375.000.000	rupiah	Adjustment of Kota Yogyakarta
16	Rent expense of pool buildings for five years	600.000.000	rupiah	Adjustment of Kota Yogyakarta
17	Office equipment expense	25.000.000	rupiah	Bus operator survey
18	Pool and garage equipment expense	25.000.000	rupiah	Bus operator survey
19	Office, garage and equipment maintenance	20.000.000	rupiah	Bus operator survey
20	Office administration expense per year	15.000.000	rupiah	Bus operator survey
21	Electricity and water expense per year	12.000.000	rupiah	Bus operator survey

No	Description	Sample	Unit	Assumption
22	Official travel expense per year	25.000.000	rupiah	Bus operator survey
23	Company tax	1.000.000	rupiah	Bus operator survey
24	Route clearance	68.000	rupiah	(Rp. 68.000/corporation/year) Local Regulation of DIY No. 4/2012
25	Others	2.000.000	rupiah	Bus operator survey
26	Vehicle periodic test expense per test	65.000	rupiah	Local Regulation of DIY No. 4/2012
27	Vehicle insurance: Insurance costs per bus per year (2,5% x bus price)	21.250.000	rupiah	The Decree of the Directorate General of Land Transportation SK.687/AJ.206/DRJD/2002
28	Passenger insurance per bus per year	6.048.000	rupiah	Load factor 70%; Rp. 60,00 per passenger

Source: Author, 2020

All cost components are calculated in units of rupiah and then divided by kilometres per year. It aims to determine the bus operating costs per mileage and to see how much the government must pay the cost, and the benefits to be obtained by operators are also state in this new BOK calculation.

Meanwhile, the price reference used during the calculation process can take from several sources. As for the source of the cost, reference can be either primary data or secondary data. For example, primary data used as a basis for calculating bus prices, spare parts prices, daily allowances for drivers and officers, bus service fees, and others. While secondary data can be used as a basis, for example, in calculations related to interest rates, regional minimum wages, fees, etcetera.

VIII. Vehicle operating cost (BOK) calculation modules

As mentioned in the previous section, in the BOK calculation, there will be six worksheets that contain three worksheets for data processing and a main worksheet to show the recapitulation results of the data processing in each worksheet. There are also two other worksheets, a worksheet that contains a guide for users and a worksheet that contains bus specifications and the expense cost of the buses. The six worksheets are Guidelines, Data, Operating service targets, Investment, Operational and maintenance, and the Operator costs as the main worksheet of the recapitulation results.

VIII.1. Model overview

This model will estimate the amount of vehicle operating costs to run bus services for one year. This model can estimate vehicle operating costs in the operation of urban public transport with specifications for small, medium, large, maxi, double-decker, and articulated bus services. There is a guideline for users to use this calculation formula. Each unit will have different requirements or may have different information, and the model is flexible so that it allows each user to adjust inputs to calculate estimates better. This model tested on Microsoft Excel 2013 versions, and it recommended to use this model on that version or the newer version.

VIII.2. Worksheets in the model

The main worksheet is the “*Biaya Operator*” worksheet for calculating vehicle operating costs. The worksheet has four companion worksheets that are connected to find out the vehicle operating costs. The first worksheet is “*Data*” is divided into two tables that will be a reference in the calculation process. The second one is “*Service Targets*” to identify inputs related to the calculated public transport service plan, such as mileage, operational time, travel time, and headway plans. These components will be the basis in the planned BOK calculation. The third one is “*Investasi*” to illustrate the amount of initial investment costs needed to provide services, depreciation value, and capital interest if the cost of purchasing a bus uses a loan from a bank. The next worksheet is “*O&M*” to describe what components

needed in operational and maintenance activities needed in urban public transport operations for one year. It related to service fees, wages for drivers, office and garage personnel, office operational expense, etcetera. The last one is the "*Biaya Operator*" as a recapitulation of previous worksheet calculations that presents information to relevant stakeholders.

VIII.3. Instructions

There are five Worksheets integrated with the main "*Biaya Operator*" worksheets that connected with four other worksheets as support. There are 2 (two) parts that must fill, namely in the "*Data*" and "*Investasi*" worksheets with other worksheets automatically filled in based on other worksheets.

1. Data

In the "Data" worksheet, there are two parts of the table, where Table A is the basis of technical standards related to the type of bus. The data in Table A is the result of secondary data and can be changed if there is further data that is more valid. Whereas in Table B, is a mandatory list of contents that **must be filled out** by prospective operators as a basis for BOK calculations. The items in Table B are as follows:

- **Bus prices:** fill in the price range of buses based on the type of bus planned according to the required technical standards
- **Capital interest costs:** Fill in the interest rates that were in effect during the BOK calculation process
- **Fuel prices:** filled in based on fuel prices, according to the type of fuel used
- **Machine oil prices:** filled with the price of engine oil to be used according to the market price in the study area (price of 1 litre)
- **Axle oil prices:** filled with axle oil prices that will use the following market prices in the study area (price of 1 litre)
- **Transmission oil prices:** filled with transmission oil price that will use according to the market price in the study area (1-liter price)

- **Grease oil price:** filled with grease oil price which will use according to the market price in the study area (1 kg price)
- **Service fees of minor vehicle maintenance:** fill in the price for minor service fees according to the type of bus and following the price range in the study area
- **Brake fluid:** filled with the price of brake fluid to be used according to the market price in the study area (price of 1 litre)
- **Oil filter:** filled with oil filter price that will use according to the type of bus and according to the market price in the study area (price of 1 piece)
- **Air filter:** filled with the price of air filters that will use according to the type of bus and according to the market price in the study area (price of 1 piece)
- **Diesel filter:** filled with the price of a diesel filter that will be used according to the type of bus and according to the market price in the study area (price of 1 piece)
- **Other elements:** fill in the amount of costs usually incurred by operators for spare parts other than those calculated, at the time of operation in one year according to the type of bus and following the price range in the study area
- **Service fees of major vehicle maintenance:** fill in the price for significant service fees according to the type of bus and according to the price range in the study area
- **Bus cleaning fees:** filled in the price for the bus wash fee according to the type of bus and according to the price range in the study area
- **Tire price:** fill in the price of the tire that will use according to the type of bus and according to the market price in the study area (price of 1 piece)
- **Wages of driver:** filled following the regional minimum wages in the study area
- **Fringe benefits of driver:** filled following the price range in the study area
- **Driver's uniform:** filled following the price range in the study area

- **Terminal charges:** filled with costs following the terminal retribution policy in the study area
- **Rent expense of office buildings:** filled following the price range in the study area (multiplied by the rental period)
- **Rent expense of pool and garage buildings:** filled following the price range in the study area (multiplied by the rental period)
- **Office equipment expense:** to be inputted with the range of office equipment values usually owned by the operator according to the price range in the study area
- **Pool and garage equipment expense:** filled with the range of pool and garage equipment values commonly owned by operators according to the price range in the study area
- **Office, garage, and equipment maintenance expense:** filled with the range of costs usually incurred by the operator according to the price range in the study area
- **Office administration expense per year:** filled with the range of costs usually incurred by the operator according to the price range in the study area
- **Electricity and water expense per year:** filled with the range of costs usually incurred by the operator according to the price range in the study area
- **Official travel expense per year:** filled with the usual range of costs incurred by the operator according to the price range in the study area
- **Company tax:** filled with the range of costs usually incurred by the operator following the price range in the study area
- **Route clearance:** filled with the cost following the route permit policy in the study area
- **Other costs:** fill in the range of costs usually incurred by the operator according to the price range in the study area
- **Vehicle periodic test (KIR):** filled with fees according to vehicle periodic test policy in the study area

2. Target Layanan (Operating service targets)

This worksheet is an input in the BOK calculation process, including the operating service target plans for one route. Several green columns need to fill with the following explanation:

- **Operational time (hours):** enter the planned bus service operating hours
- **Route length (km):** input the length of the corridor in one trip from the planned bus route based on survey data
- **Monthly operational day (days):** enter the operating plan for each bus for one month
- **Time travel (minutes):** enter the trip length in one trip of the planned bus route based on survey data
- **Headway plan (minutes):** enter the headway plan on the planned bus route
- **Number of stops (units):** enter the number of stops along the corridor of the planned bus route

Note: Operating service targets based on government needs

3. Investasi (Investment)

This worksheet will inform the amount of costs that need to be prepared by the operator in the initial stages before operational implementation. On this worksheet, the operator **must fill in the type of bus** so that the operational costs are known. The choice of bus type (with standard format) will directly integrated with the technical specifications needed in the BOK calculation.

Note: fill the type of bus planned with the standard format "Besar/Sedang/Kecil/Maxi/Tingkat/Gandeng" (the bus specification column in the BOK calculation will adjust automatically)

4. Operasional dan Pemeliharaan (Operational and maintenance)

This worksheet is related to the calculation of the amount of costs required during the operational period of urban public transportation. Based on this worksheet, it can see the amount of costs and what components needed in

operational and maintenance activities during the contract period in one year. This worksheet is the process of calculating the operational and maintenance activities required following the input obtained from the working sheet "**Data.**"

5. Biaya Operator (Operator costs)

This worksheet is a recapitulation of the BOK calculation that carried out on the previous worksheet. Based on the recapitulation of this worksheet, it can be seen the amount of need for initial investment and operational and maintenance costs when urban public transport operations take place either per day, month, or year and per bus or as a whole following the number of fleets. Finally, it can conclude how much it costs for urban public transport operations per km on a particular route.

IX. The new vehicle operating cost (BOK) calculation spreadsheets

Examples of new BOK calculations are attached to a separate document. The document contains BOK calculation sheets for small, medium, large, maxi, double-decker, and articulated buses. The document also contains technical specifications based on the bus types above. The simulation used in the spreadsheet, as an example calculation, uses the Yogyakarta City reference and assumptions on the “*Bus Besar*” or Large Bus type on the investment, operational and maintenance (O&M) worksheet and operator costs. The user can adjust the bus type as needed by referring to the "Data" worksheet in the spreadsheet. Also included in the spreadsheet are markers to distinguish categories of filling components as following the filling instructions described in the previous section.

X. Identification of challenges and risks of vehicle operating cost (BOK) calculations

Vehicle operating costs (BOK) are indicators used as a basis for determining minimum fares and providing subsidies. There are several challenges and risks in the calculation of BOK in urban public transportation. One of them is the diverse characteristics of urban areas in Indonesia that affects the prices used for the BOK calculation plan. Moreover, the price and economic development can also change the BOK annually, so an annual evaluation needed during the contract period. Some challenges and risks in the BOK calculation process for urban public transport are as follows.

1. Operating service targets as an input for BOK calculation

The BOK calculation will adjust to the urban public transport operating service target plans. The calculation of operating service costs will be an input for the BOK calculation process, so we need data and analysis that can account for the results of BOK calculations that are right on target.

2. BOK calculation process

There are no exact numbers in the BOK calculation process, except for the predefined calculation components. The purpose of the statement is that the value of the BOK calculation component may change according to the prevailing prices at local and time levels because each region has a different price standard. This condition caused by various characteristics of Indonesia territory and city size. In general, three things can affect BOK, namely the type of vehicle, vehicle age, and economies of scale. Moreover, it affects the BOK calculation process in the following year.

XI. Implementation strategy for competitive bidding for operators

XI.1. General

Nowadays, the licensing of urban public transport services in Indonesia adheres to a quality licensing system. It replaces the previous system, namely, quantity licensing. The government, through contractual bodies, contracts to provide licenses for operators who can fulfil the minimum service standards for public transport services with specific vehicle operating costs. Implementation of quality licensing system is regulated in Law No. 22 Year 2009 jo. Government Regulation No. 74 Year 2014. It expected to be able to eliminate the weaknesses of the quantity licensing system.

The principle that applies in the bidding mechanism is that all operators are free to choose the desired route. The specifications of the route that arranged regulate vehicle and operational requirements in full, including aspects of quantity and quality. Bidders make a closed system bid unit price stated in Rp/km along with technical and administrative bids. The lowest bidder with technical specifications following the provisions set in the bid documents and complete administrative documents wins the bid and binds a contract for five years with an annual evaluation. Operators paid according to operating achievements specified in the specifications. Any violation of the contract made by the operator, both qualitative and quantitative, results in a fine. If the contract period runs out, the operator must return the route served to the government, and the government will open a new offer. Former operators can re-join offer routes that have served.

Each route has its contract and is unique because it adjusted to field conditions. Contracts are transparent, and anyone has the right to know, so that openness is created and avoiding practices of corruption, collusion, and nepotism (KKN). Bus operating costs create by competitive market prices with such a bidding mechanism. The existence of competition between operators will reduce operating costs with the same or better quality. In other words, operators will compete for efficiency so that business costs are minimal and competing to improve services to attract consumers. Moreover, this system implemented to select quality operators

based on the fairness of prices, in this case, the operation of urban public transportation.

In the process to take part in the tender, there are eligibility requirements that must meet to become a Transport Operator, as follows:

1. Having a valid business license/operating permit of public transport.
2. Sign an integrity pact
3. Qualified the requirements listed in the procurement document
4. Have working capital of at least the total operational costs, maintenance costs, overhead costs and tax costs for three months based on the document balance in the bank account of the former transport operator or bank guarantee available at the time of registering for the procurement process until the issuance of the appointment letter as a transportation operator.
5. Having excellent finance, evidenced by a financial support letter from the bank, and attach supporting documents.
6. Have audited financial statements for at least the last two years.
7. Able to provide transportation no later than 12 months after the signing of the cooperation agreement evidenced by a promissory letter from APM.
8. Have a large area of land to accommodate the provided transportation.
9. They are not bankrupt.
10. Enter into a long-term transport maintenance contract with APM or an official partner recommended by APM.
11. Provides a bank guarantee of 5% of the total value of the cooperation agreement that must extend annually
12. Not included in the blacklist of goods/services procurement.

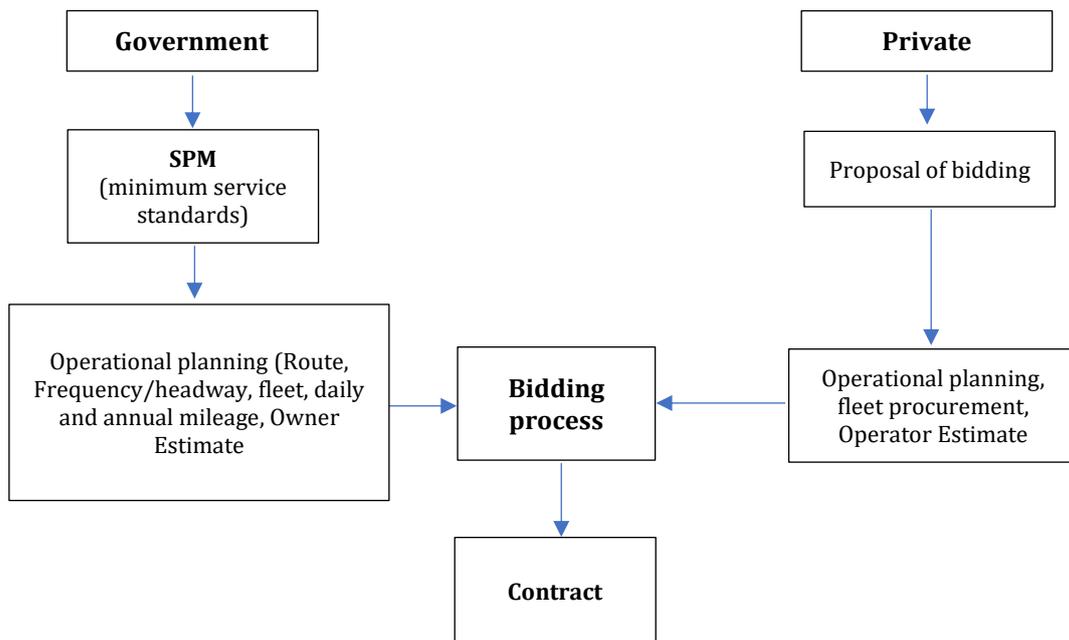


Figure 5 Bidding scheme of urban public transport operations

XI.2. Offering vehicle operating costs

Transjakarta's success in providing reliable services to its customers is not only related to the management and operational systems of this company. The service purchase strategy used by Transjakarta managed to maintain its excellent performance. This performance realized through the right bus conditions following minimum service standards (SPM) set by the DKI Provincial Government and must implement bus operators. Reliable operation realized with the correct BOK calculation and following operating service targets. It must also be considered by prospective operators who will be selected to hold urban public transport, which have competitive offers without prejudice to the SPM and operating service target plans (quality licensing).

1. The specifications of the route arranged to regulate complete conditions on vehicles and operations that include aspects of quantity and quality so that in the BOK calculation process, it is necessary to pay close attention to the SPM and the planned operating service targets.

2. The lowest bidder with technical specifications following the provisions of winning the bid, so that prospective operators have a price option that varies but still refers to the specified technical specifications.
3. Do efficiency so that production costs become minimum without compromising SPM services and operating service targets.
4. Provide offers based on fair price and quality, including understanding the rules of the existing policies in the region, such as those related to the cost of route clearances, company taxes, vehicle periodic test charges, and vehicle taxes.
5. Already have land to accommodate transportation to be provided and offices, which will support cost efficiency.
6. Collaborate with APM so that it will have the advantage of being able to carry out long-term fleet maintenance contracts with APM and efficiently provide the fleet as needed.
7. Able to manage an office, pool, and garage crewmembers as part of supporting efficiency in the bidding process.

CONCLUSIONS

Road-based urban public transport operations require adequate financing following the needs of the vehicle operating cost (BOK) plans. Moreover, BOK are indicators used as a basis for determining minimum fares and providing subsidies. There are several examples of BOK calculations that used as a guide. This activity aims to develop a BOK calculation model that can use universally, is easy to use and understand and presents complete information.

Based on the studies that have carried out, there are several conclusions obtained, as follows.

1. The results of policy reviews, studies, and practices in the field related to the BOK calculation model in the implementation of urban public transport conclude that the BOK calculation method is grouped into two because Curitiba BRT is assumed to have the same calculation method as SK Director-General and Transjakarta has its calculation method;
2. There are main components that can affect the cost per kilometre in the BOK calculation in each region because it is related to the characteristics of Indonesia's territory, namely west, central and east;
3. The unit cost price in the different BOK calculations for each region will be left blank and given an assumption statement to be filled separately. Relating to the unit price multiplier coefficient requires further study separately;
4. The new BOK calculation uses the calculation component contained in the Decree of the Director-General of Land Transportation SK.687/AJ.206/DRJD/2002. The reason for using these components is that they use a more straightforward form, but have accommodated the components that need to be in the BOK calculation;
5. Transjakarta BOK calculations exemplified for grouping components. The grouping change starts from direct and indirect costs into investment costs and operational and maintenance costs. Components based on the Decree of the Director-General adjusted to the two new groups. The aim is to make it more accessible during the calculation and evaluation process prepared by the relevant stakeholders.

6. Moreover, this grouping will make the BOK calculation form user friendly for both the government and prospective operators, so that they can more easily know the investment needs, prepared operational and maintenance costs, as well as the potential, gained benefits;
7. The new calculation will accommodate the operating service targets mechanism so that the other calculations do not require other worksheets;
8. Five worksheets integrated, and the main worksheet consists of "Data" and "Operating Cost" connected to three other worksheets as support. Two-colour columns must fill by the following notes:
 - All the green columns in the model fill with the assumption of the planned target of urban public transport operation services.
 - All blue columns in the model used to fill the assumption that the costs of each calculation component will adjust to the conditions in the study area.
9. Stakeholder allows all operators to choose available routes. It is made with a closed system of unit route prices stated in Rp/km along with technical and administrative offers.
10. The lowest bidder with technical specifications following the provisions set in the bid documents and complete administrative documents wins the bid and binds a contract for five years with an annual evaluation.
11. Operators who will be selected to run urban public transport are operators with competitive offers without prejudice to the SPM and the operating service target plans (quality licensing).

GLOSSARY

APM

'Agen pemegang merk (APM)' or an exclusive licensee agent is a national company appointed by manufacturing companies that own brands, to import exclusively, market, distribute, and serve after-sales services in certain regions.

Deadhead

Deadhead is when a revenue-gaining vehicle operates without carrying or accepting passengers, such as when coming from a garage to begin its first trip of the day.

Headway

Headway is the amount of time between transit vehicle arrivals at a stop.

Kir

Kir or *keur* is a periodic test of the vehicle to determine the feasibility of vehicles operating on the highway.

Overhaul

Overhaul is a machine check which is done by disassembling the engine to replace the components that are considered problematic.

Rit

Rit is a one-time vehicle trip from the place of origin to the destination.

SPE

Sistem Parkir Elektronik (SPE) or electronic parking system is a tool used to assist the process of recording and collecting terminal charges.

SPM

Standar Pelayanan Minimum (SPM) is a minimum standard that must be met by operators in carrying out urban public transport services that are generally determined by local governments in the region.

Tariff BEP

Break-Even Point (BEP) is the condition of not earning profit and loss when operational activities take place; in other words, revenue is equal to costs incurred. *Tarif BEP* is the amount of fares that must be paid by passengers for public transport services that they receive without the value of the benefits of the services. The amount of the *tariff BEP* is the base rate multiplied by the average distance.

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