Feasibility study on small cars as an alternative to conventional fleets due to low occupancy: case study in Indonesia

Muji Setiyo a,c, Eko Muh Widodo b, Muhammad Imron Rosyidi b, Budi Waluyo a,c, Zulfiqar Bagus Pambuko d, Noreffendy Tamaldine e

a Department of Automotive Engineering, Universitas Muhammadiyah Magelang, Jl. Bambang Soegeng, Mertoyudan, Magelang, 56172, Indonesia
b Department of Industrial Engineering, Universitas Muhammadiyah Magelang, Jl. Bambang Soegeng, Mertoyudan, Magelang, 56172, Indonesia
c Center for Energy Studies, Universitas Muhammadiyah Magelang, Jl. Bambang Soegeng, Mertoyudan, Magelang, 56172, Indonesia
d Center of Research, Development, and Community Services, Universitas Muhammadiyah Magelang, Jl. Bambang Soegeng, Mertoyudan, Magelang, 56172, Indonesia
e Center for Advanced Research on Energy, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100, Durian Tunggal, Melaka, Malaysia

ARTICLE INFO

Keywords:
Energy
Automotive engineering
Combustion engine
Energy economics
Urban energy consumption
Conventional fleet
Small car RE60
Feasibility study

ABSTRACT

Consumer interest in privately managed urban transport services in Indonesia are showing a declining trend. On the other hand, the presence of Transportation on Demand (ToD) based on Internet of Things (IoT) has attracted the majority of conventional fleet customers which contribute to the declining trend of occupancy. Therefore, this study aims to present a feasibility study of a small car RE60 Three Passenger and One Driver (3P+1D) four-wheeler as an alternative to replace conventional fleets. The Break-Even Point (BEP), Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period (PP) are analyzed based on vehicle operating data. The analysis shows that there is an additional monthly income flow of IDR 1,533,122 and IDR 2,536,946 from RE60 operations compared to the high and low consumption of fuel from existing fleets, respectively. In conclusion, it is feasible to invest in small car RE60 as a replacement for the existing fleets since the fundamental indicators (BEP, NPV, IRR, and PP) showed positive results before the specified installment period. Sensitivity analysis also shows good results, NPV shows positive results (≥0) although the input conditions are made pessimistic to -30% from NPV base case. The BEP of RE60 will cut distance travelled at 190,670 km and 115,225 km, respectively. NPV of IDR 33,088,000 and IDR 80,841,000 will be obtained at the 60th month after the operation and IRR also enabled good scores, at 2.24% and 4.17%.

1. Introduction

In recent decades, the phenomenon of urbanization has occurred in all cities around Indonesia. Congestion and air pollution in big cities have increased significantly. Meanwhile, the Government has not succeeded to implement clean and inexpensive modes of transportation, such as electric propulsion-based buses. In several cities such as Jakarta, Medan, Aceh, Semarang, Solo, Yogyakarta and several other cities, they have implemented a government-subsidized city transportation system. However, this practice has not seemingly provided public satisfaction [1, 2, 3, 4, 5]. In 2010, the presence of Transportation on Demand (ToD) based on Internet of Things (IoT) provided a new alternative to consumers.

Unfortunately, the presence of ToD based on IoT, especially Go-Car and Grab-Car caused concern to the urban public transportation business in Indonesia. Unscheduled public transportation operations of fleets dominated by old cars have to compete with Go-Car and Grab-Car which provide more comfort as well as competitive prices for consumers. The phenomenon of ToD or car-sharing has been operated in North America and Europe for so long [6, 7]. However, it has begun to be massively carried on in Indonesia since 2015. Go-Car and Grab-Car which were initially used in metropolitan cities in Indonesia such as Jakarta, Surabaya and Bandung, are now starting to reach out other small cities.

The ToD basic principle on IoT is a car-sharing in which people can get the benefit of using a private car without buying and paying the cost of car ownership [7]. On one hand, the availability of ToD provides new alternatives for consumers when conventional fleets' services are not reliable. For example, inaccuracies in schedules and routes due to congestion [8]. On the other hand, if the government does not intervene
through regulation, it will threaten the livelihoods of the conventional fleet’s business operators. The benefits and risks of the ToD existence based on IoT have been discussed in detail from various point of views such as economic, social, and policy. Several solutions have also been proposed, though it is difficult to achieve mutual justice [9, 10, 11, 12, 13].

In early 2016, thousands of crews and owners of conventional fleets held massive and simultaneous demonstrations in almost all major cities in Indonesia. Their income continued to decline due to passengers sharing with ToD. They demanded the government to create a regulation in which ToD must also fulfill the roadworthiness test from the Department of Transportation. In addition, they also requested ToD to be under the Legal Entity, not as private ownership, similar to the regulations for taxis and other public fleets. But at the end of 2016, many conventional taxis that were previously opposed to ToD, joined to the ToD business as they see more benefits. Until 2019, there is no exact data on the number of ToDs, but the number is estimated to reach more than 90,000 drivers [14].

Although the Government has issued policies through many discussion, conflicts between the conventional fleets and the ToD still continue, as reported by Wijayanto [15]. Government policies are still considered inequitable by the conventional fleet’s driver, due to unfairness rates, areas of operation, vehicle administration, driving license, and the quality of the fleet. In fact, there is a significant disparity in the quality of the conventional fleets with the ToD fleets. Meanwhile, regenerating the conventional fleets with the new ones (vehicle retirement program) in a short term cannot be done by the Government due to economic factors though it has the opportunity to increase fleet occupancy and reduce emissions [16].

In Magelang, Central Java, for example, since the coming of ToD, conventional fleet’s occupancy has continued to decline. We randomly did capture on lane 4, the busiest lane among the other 11 lanes. The capture was done on the main street of the city (https://www.google.com/maps/@-7.4765465,110.2175953,18z) in normal days (Figure 1). As a result, conventional fleet’s occupancy was very low, as shown in Figure 2. We also conducted an observation by following a fleet that operates full day on lane 4, in 18 laps starting from 06.30 AM - 07.00 PM (12.5 h). The observation results indicated that the occupancy was very low, averaging under 30% of a maximum capacity of 12 passengers. The fleet owner got a share of IDR 90,000 (~USD 6.39) and the driver only

![Figure 1. Line 4 and location for capturing conventional fleet occupancy (source: https://www.google.com/maps/@-7.4765465,110.2175953,18z).](image)

![Figure 2. Capture of line 4 conventional fleet occupancy in Magelang City: (a) 2 passengers; (b) 1 passenger; (c) 1 passenger; (d) 4 passengers; (e) 4 Passengers; (f) 7 passengers (students who pay 50% of the normal fare).](image)
The Bajaj Qute RE60 small car specifications used in this study are presented in Table 1. Furthermore, the main features of the car can be seen in the brochure provided by the manufacturing company [25].

The fuel consumption test was carried out using the full to full fuel tank method where the Bajaj RE60 followed the conventional fleet on track 4 as presented in Figure 1. Each car was given 4 passengers, including the driver. The two cars departed from the fuel station in the same position with full tanks and then operated for 5 rounds which covered a total distance of 49.5 km. After completing 5 turns, both vehicles returned to the fuel station to be fully refilled. Finally, the fuel consumptions of the two cars were compared.

### 2.3. Feasibility analysis

After fuel consumption could be estimated, a Break-Even Point (BEP) analysis was conducted to determine the minimum mileage for covering the investment cost to purchase the RE60 unit considering the salvage value of the old fleet. **BEP** for mileage was calculated using Eq. (1).

\[
BEP = \frac{I_0}{(RC_{ef} - RC_{RE60})}
\]

Where, \(I_0\) is the initial investment (price of the new RE60 - salvage value of the old fleet), \(RC_{ef}\) and \(RC_{RE60}\) are running costs of existing fleets and new fleets (Bajaj Qute RE60), respectively.

To assess investment feasibility, this study used a Net Present Value (NPV), an Internal Rate of Return (IRR), and Payback Period (PP). NPV was discounted based on investment costs, while IRR was the interest rate that would make the present value of the expected results be received. This program was considered feasible if NPV > 0 and IRR were greater than bank interest. In this analysis, additional net monthly income was calculated from the difference in running costs between RE60 and conventional fleet. Then, NPV was calculated using Eq. (2).

\[
NPV = \left[ \pi \times \left( 1 - \frac{(1+i)^{-n}}{i} \right) \right] \left( \frac{S}{(1+i)^n} \right) - I_0
\]

where, \(\pi\) is savings per month, \(i\) is the bank interest, \(n\) is the installment period to the bank, and \(S\) is the estimated salvage value of RE60 in the 60th month.

Then, Payback Period (PP) was calculated to assess the period for recovering investment costs with net cash flow (Eq. 3). The sooner the PP is reached, the more promising this program will be implemented.

\[
PP = \frac{I_0}{\pi}
\]

### 3. Result and discussion

#### 3.1. Operation data

Table 1. Specification of RE60 small car [25].

| Item            | Specification          |
|-----------------|------------------------|
| Engine          | 217cc Petrol           |
| Transmission    | Constant Mesh Manual   |
| Max speed       | 70 km/h                |
| Kerb weight     | 399 kg                 |
| Seating capacity| Driver +3              |
| Length          | 2752 mm                |
| Width           | 1312 mm                |
| Height          | 1652 mm                |
| Wheel base      | 1925 mm                |
| Wheel track     | 1143 mm                |
| Ground clearance| 180 mm - unladen        |
| Turning circle radius | 3.5 Meter            |

Figure 3. Photographic view of small car Bajaj Qute RE60 (3P+1D) compared with conventional fleet.

[Image of table and photograph]
conventional fleets and for small cars RE60. Conventional and RE60 fleets were operated regarding to the traffic conditions without intervention and comply with city speed standards, including adherence to signs and traffic light. Two vehicles travelled 49.5 km at an average speed of 24 km/h and maximum speed of 66 km/h. Fuel consumption for both vehicles with RON 90 (petrol) fuel were 3.66 L for conventional fleets (Daihatsu Zebra 1000 cc) and 1.96 L for RE60. After a conversion, both fuel consumptions were 13.25 and 25.25 km/L for conventional fleet and RE60, respectively. The fuel consumption of the conventional fleet can be more wasteful if the engine used is 1300 cc or if it is lack of maintenance. With an assumption that the fleet operates 18 laps and takes a distance of approximately 180 km/day, and the price of RON 90 is IDR 7650 (the on-road price of the new Bajaj Qute RE60 of IDR 73,000,000 (based on their experience. Meanwhile, the Bajaj Qute RE60 maintenance cost data was obtained through personal communication with the Manager of PT Megalestari Mobilindo, who has had an experience operating the Bajaj Qute RE60 in Jakarta, Indonesia. Salvage value of the existing fleet was estimated at IDR 15,000,000 (the lowest possible price) and an on the road price of the new Bajaj Qute RE60 of IDR 73,000,000 (based on the brochures from the distributors). Operational data for potential annual saving and BEP calculations are given in Table 2. Next, the linear curve of distance travelled and running costs, as well as the break-even point is presented in Figure 5 and the data is presented in Table 3.

3.2. Economics analysis

Economic analysis was carried out based on 4 main components; Break-Even Point (BEP), Net Present Value (NPV), an Internal Rate of Return (IRR), and Payback Period (PP). First, we estimated the BEP based on operational data obtained from observations. Annual mileage was estimated with an average daily operation, 180 km/day and 28 days per month. RE60 with fuel consumption of 25.25 km/L compared to 2 conventional fleet conditions, cars with low fuel consumption (13.52 km/L) and cars with high fuel consumption (10 km/L).

Annual maintenance costs were obtained through interviews with drivers and staff of the Department of Transportation, Magelang city, based on their experience. Meanwhile, the Bajaj Qute RE60 maintenance cost was obtained through personal communication with the Manager of PT Megalestari Mobilindo, who has had an experience operating the Bajaj Qute RE60 in Jakarta, Indonesia. Salvage value of the existing fleet was estimated at IDR 15,000,000 (the lowest possible price) and an on the road price of the new Bajaj Qute RE60 of IDR 73,000,000 (based on the brochures from the distributors). Operational data for potential annual saving and BEP calculations are given in Table 2. Next, the linear curve of distance travelled and running costs, as well as the BEP intersection point is presented in Figure 5 and the data is presented in Table 3.

Table 2. Operational data for annual saving calculation and BEP.

| Parameters                                      | Value        | Unit | Formula     |
|-------------------------------------------------|--------------|------|-------------|
| Milesages per year                              | 60,480.00    | km   |             |
| Fuel consumption of existing fleet (low fuel consumption) | 13.52        | km/l | FCefl       |
| Fuel consumption of existing fleet (high fuel consumption) | 10.00        | km/l | FCeh        |
| Fuel consumption of RE60                        | 25.25        | km/l | FCRE        |
| Gasoline RON 90 price/liter                    | 7,650.00     | IDR  | Cg          |
| Annual fuel cost for existing fleet (low fuel consumption) | 34,221,301.78 | IDR  | Cgefl* Cg   |
| Annual fuel cost for existing fleet (high fuel consumption) | 46,267,200.00 | IDR  | Cgefh* Cg   |
| Annual fuel cost for RE60                       | 18,323,643.56| IDR  | CgCRE       |
| Annual saving RE60 to existing fleet (low fuel consumption) | 15,897,658.21 | IDR  | CgCRE - Cgefl |
| Annual saving RE60 to existing fleet (high fuel consumption) | 27,943,556.44 | IDR  | CgCRE - Cgefh |
| Capital cost for RE60 ownership                 | 73,000,000.00| IDR  |             |
| Salvage value of existing fleet, estimated      | 15,000,000.00| IDR  |             |
| Total capital cost for RE60 ownership           | 58,000,000.00| IDR  |             |
| Annual maintenance cost for existing fleet (include tax), estimated | 6,014,400.00 | IDR  | Cmef        |
| Annual maintenance cost for RE60 (include tax), estimated | 3,514,600.00 | IDR  | CmCRE       |
| Running cost/km for existing fleet (low fuel consumption) | 665.27       | IDR  | RCefl* (Cgefl + Cmef)/vm |
| Running cost/km for existing fleet (high fuel consumption) | 864.44       | IDR  | RCeh* (Cgefh + Cmef)/vm |
| Running cost/km for RE60                        | 361.08       | IDR  | RCCRE       |
| BEP RE60 to existing fleet (low fuel consumption) | 190,669.82   | km   | I0          |
| BEP RE60 to existing fleet (high fuel consumption) | 115,225.14   | km   | I0          |

Table 2. Operational data for annual saving calculation and BEP.

- **Parameters**: Milesages per year, Fuel consumption of existing fleet, Fuel consumption of RE60, Gasoline RON 90 price/liter, Annual fuel cost for existing fleet, Annual fuel cost for RE60, Annual saving RE60 to existing fleet, Capital cost for RE60 ownership, Salvage value of existing fleet, Total capital cost for RE60 ownership, Annual maintenance cost for existing fleet (include tax), Annual maintenance cost for RE60 (include tax), Running cost/km for existing fleet, Running cost/km for RE60, BEP RE60 to existing fleet, BEP RE60 to existing fleet.

- **Value**: 60,480.00 km, 13.52 km/l, 10.00 km/l, 25.25 km/l, 7,650.00 IDR, 34,221,301.78 IDR, 46,267,200.00 IDR, 18,323,643.56 IDR, 15,897,658.21 IDR, 27,943,556.44 IDR, 73,000,000.00 IDR, 15,000,000.00 IDR, 58,000,000.00 IDR, 6,014,400.00 IDR, 3,514,600.00 IDR, 665.27 IDR, 864.44 IDR, 361.08 IDR, 190,669.82 km, 115,225.14 km.

- **Unit**: km, km/l, km/l, km/l, IDR, IDR, IDR, IDR, IDR, IDR, IDR, IDR, IDR, IDR, IDR, IDR, IDR, km.

- **Formula**: Mileages per year = 60,480.00 km, Fuel consumption of existing fleet (low fuel consumption) = 13.52 km/l, Fuel consumption of RE60 = 25.25 km/l, Gasoline RON 90 price/liter = 7,650.00 IDR, Annual fuel cost for existing fleet (low fuel consumption) = 34,221,301.78 IDR, Annual fuel cost for existing fleet (high fuel consumption) = 46,267,200.00 IDR, Annual fuel cost for RE60 = 18,323,643.56 IDR, Annual saving RE60 to existing fleet (low fuel consumption) = 15,897,658.21 IDR, Annual saving RE60 to existing fleet (high fuel consumption) = 27,943,556.44 IDR, Capital cost for RE60 ownership = 73,000,000.00 IDR, Salvage value of existing fleet, estimated = 15,000,000.00 IDR, Total capital cost for RE60 ownership = 58,000,000.00 IDR, Annual maintenance cost for existing fleet (include tax), estimated = 6,014,400.00 IDR, Annual maintenance cost for RE60 (include tax), estimated = 3,514,600.00 IDR, Running cost/km for existing fleet (low fuel consumption) = 665.27 IDR, Running cost/km for existing fleet (high fuel consumption) = 864.44 IDR, Running cost/km for RE60 = 361.08 IDR, BEP RE60 to existing fleet (low fuel consumption) = 190,669.82 km, BEP RE60 to existing fleet (high fuel consumption) = 115,225.14 km.

- **Formula**: Mileages per year = 60,480.00 km, Fuel consumption of existing fleet (low fuel consumption) = 13.52 km/l, Fuel consumption of RE60 = 25.25 km/l, Gasoline RON 90 price/liter = 7,650.00 IDR, Annual fuel cost for existing fleet (low fuel consumption) = 34,221,301.78 IDR, Annual fuel cost for existing fleet (high fuel consumption) = 46,267,200.00 IDR, Annual fuel cost for RE60 = 18,323,643.56 IDR, Annual saving RE60 to existing fleet (low fuel consumption) = 15,897,658.21 IDR, Annual saving RE60 to existing fleet (high fuel consumption) = 27,943,556.44 IDR, Capital cost for RE60 ownership = 73,000,000.00 IDR, Salvage value of existing fleet, estimated = 15,000,000.00 IDR, Total capital cost for RE60 ownership = 58,000,000.00 IDR, Annual maintenance cost for existing fleet (include tax), estimated = 6,014,400.00 IDR, Annual maintenance cost for RE60 (include tax), estimated = 3,514,600.00 IDR, Running cost/km for existing fleet (low fuel consumption) = 665.27 IDR, Running cost/km for existing fleet (high fuel consumption) = 864.44 IDR, Running cost/km for RE60 = 361.08 IDR, BEP RE60 to existing fleet (low fuel consumption) = 190,669.82 km, BEP RE60 to existing fleet (high fuel consumption) = 115,225.14 km.
The average of all banks in Indonesia [27] was 14.50% p.a. for corporate credit. Meanwhile, the general interest rate on May 2019, the highest prime lending rate analysis was 0.8% per month, according to the amount issued by the Financial Services Authority.

Based on IRR simulation, the replacement of existing fleet with more fuel for each laps.

Second, after the difference in operational costs was obtained, the analysis was continued by estimating the NPV. Prospective owners of RE60 must invest at least IDR. 58,000,000 obtained from the new Bajaj Qute RE60 price (IDR 73,000,000) minus the salvage value of the existing fleet (IDR 15,000,000). The bank interest rate used in this analysis was 0.8% per month, according to the amount issued by Financial Services Authority on May 2019, the highest prime lending rate was 14.50% p.a. for corporate credit. Meanwhile, the general interest rate was 9.54% p.a., the average of all banks in Indonesia [27].

We consider the salvage value of RE60 at the end of the fifth year (60th month) with a depreciation calculator for the car given by OMNI [28]. It was assumed that the operational life of RE60 was in 10 years, but there were no significant changes, even a decline from 2018 to 2019, but there were no significant changes, even a decline from 2018 to 2019, (see Figure 4). Therefore, in this sensitivity analysis, we use optimistic and pessimistic figures of up to 30% from the NPV base case. A pessimistic condition is assumed to be +15% and +30% of NPV base case and optimistic conditions are assumed to be -15% and -30% of NPV base case. This assumption is higher than the historical data of RON 90/liter gasoline price which has decreased by 7% in the last 5 years. As a result, the replacement of existing fleet with more fuel for each laps.

small car RE60 by bank’s loan is feasible. IRR curve with capital cost of IDR 58,000,000 and the bank interest of 1% per month is presented in Figure 7 and the data is presented in Table 5.

To see how long this investment would return, a calculation of the Payback Period (PP) was given. Initially, the financial position is considered a debt of IDR. 58,000,000 for two conditions. As time goes by, the owner of RE60 will receive an accumulative proceed until the capital costs have passed. The investment in replacing public transports from low and high fuel consumption fleet to RE60 will receive a payback period at the 46th and 26th months, respectively. We have calculated PP with available data and the result is presented in Figure 8 and the data is presented in Table 6.

Finally, a sensitivity analysis is used to measure changes in NPV if there are changes in key indicators that affect project appraisal, which include mileage per year, fuel consumption of RE60, price of gasoline RON 90/liter, capital cost ownership for RE60 (considering salvage value of existing fleet), and annual maintenance cost for RE60. In this sensitivity analysis, we use NPV RE60 for the low fuel consumption of existing fleet, which is more vulnerable than the high fuel consumption of the existing fleet. RON 90 prices in Indonesia fluctuated during 2015–2019, but there were no significant changes, even a decline from 2018 to 2019 (see Figure 4). Therefore, in this sensitivity analysis, we use optimistic and pessimistic figures of up to 30% from the NPV base case. A pessimistic condition is assumed to be +15% and +30% of NPV base case and optimistic conditions are assumed to be -15% and -30% of NPV base case. This assumption is higher than the historical data of RON 90/liter gasoline price which has decreased by 7% in the last 5 years. As a result, the

Table 3. Data for distance travelled - running costs - BEP intersection point.

| Distance travelled (x1000 km) | Running Costs (million) | Saving to low fc existing fleet (million) | Saving to high fc existing fleet (million) |
|-------------------------------|-------------------------|------------------------------------------|------------------------------------------|
|                               | existing fleet (low fc, 13.7 km/l) | existing fleet (high fc, 10 km/l) | Small car RE60 (25.58 km/l) |
| 0                             | 0.00                     | 0.00                                    | 58.00                                    |
| 50                            | 33.26                    | 43.22                                   | 76.05                                    |
| 100                           | 66.53                    | 86.44                                   | 94.11                                    |
| 150                           | 99.79                    | 129.67                                  | 112.16                                   |
| 200                           | 133.05                   | 172.89                                  | 130.22                                   |
| 250                           | 166.32                   | 216.11                                  | 148.27                                   |
| 300                           | 199.58                   | 259.33                                  | 166.32                                   |

Figure 5. Estimated of distance travelled - running costs - BEP intersection point.

Where, BEP will cut distance travelled at 190,670 km and 115,225 km for conventional fleets with low fuel consumption (13.52 km/l) and high fuel consumption (10 km/l), respectively. The BEP of Bajaj Qute RE60 will be faster if compared to conventional fleet with more fuel for each laps.

Figure 6. NPV curve of RE60 investment compared to the two existing fleet conditions.
NPV shows a positive result (>0) even though the input conditions are made pessimistic to 30% as shown in Figure 9.

The results of the BEP, NPV, IRR, and PP as well as sensitivity analysis calculations all indicated a decent investment. With an assumption that additional monthly income is entirely used to pay instalments to the bank, drivers and owners will receive the fastest benefit share in the 26th month. However, the Regional Government can provide various kinds of incentives so that drivers can enjoy the benefits as soon as the new fleet operates. Incentives can be given in the form of direct subsidies to drivers until bank instalments are completed or by providing interest-free loans to fleet owners.

Furthermore, the profitability of using Bajaj Qute RE60 will be better if it uses more efficient and cleaner fuels such as LPG and CNG [29]. LPG is technically easier to apply because fuel stations in several cities in Indonesia are equipped with LPG dispensers. For CNG, which is cheaper than LPG, it needs full support from the Government to build inter-city CNG infrastructure and networks. Informed by Bajaj, the latest version of RE60 has used an electric propulsion system [30]. Of course, this electric-based vehicle will be more profitable operationally, even with various disadvantages, such as in power and limited mileage. In addition, the adoption of electric-based vehicles is also very dependent on the seriousness of the Government and the readiness of consumers. Therefore, the top-down system is considered more effective than the bottom-up system [31], which begins with the provision of policies and infrastructure, policy simulations and risk mitigation, and education to consumers.

4. Conclusion

From the economic analysis, it can be concluded that investing in the small car Bajaj Qute RE60 as a replacement for the existing fleet is feasible. All fundamental indicators such as Break-Even Point (BEP), Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period (PP) showed positive results before the specified instalment period. Sensitivity analysis also shows good results, NPV shows positive results (>0) although the input conditions are made pessimistic to -30% from Table 4. Net Present Value (NPV) data.

| Month | DF of π | DF of S | NPV of RE60 to existing fleet, (million, IDR) |
|-------|---------|---------|-----------------------------------------------|
|       |         |         | RE60 to low fc of existing fleet | RE60 to high fc of existing fleet |
| 1     | 0.99    | 1.01    | -27.51                                      | -26.51                                    |
| 10    | 9.58    | 1.08    | -16.34                                      | -6.73                                      |
| 20    | 18.42   | 1.17    | -4.83                                       | 13.66                                      |
| 30    | 26.60   | 1.27    | 5.80                                        | 32.50                                      |
| 40    | 34.15   | 1.37    | 15.63                                       | 49.91                                      |
| 50    | 41.13   | 1.49    | 24.70                                       | 65.99                                      |
| 60    | 47.57   | 1.61    | 33.09                                       | 80.84                                      |

Figure 7. IRR curve of RE60 investment compared to the two existing fleet conditions.

Table 5. Internal Rate of Return (IRR) data.

| Interest rate | IRR to low fc of existing fleet (million, IDR) | IRR to high fc of existing fleet (million, IDR) |
|---------------|-----------------------------------------------|-----------------------------------------------|
| 0.5%          | 61.18                                         | 113.10                                        |
| 2.5%          | 6.91                                          | 37.94                                         |
| 5.0%          | -20.75                                       | -1.74                                         |
| 7.5%          | -32.81                                       | -19.60                                        |
| 10.0%         | -39.11                                       | -29.11                                        |
| 12.5%         | -42.90                                       | -34.88                                        |
| 15.0%         | -45.43                                       | -38.74                                        |

Figure 8. Payback period curve of RE60 investment compared to the two existing fleet conditions.
Table 6. Payback Period (PP) data.

| Month | Proceed Accumulative (million, IDR) | PBP RE60 to low fc of existing fleet (month, IDR) | PBP RE60 to high fc of existing fleet (million, IDR) |
|-------|-----------------------------------|-----------------------------------------------|-----------------------------------------------|
| 0     | 0                                 | -58.00                                        | -58.00                                        |
| 10    | 14.68                             | -43.32                                        | -33.71                                        |
| 20    | 28.24                             | -29.75                                        | -11.26                                        |
| 30    | 40.78                             | -17.22                                        | 9.48                                          |
| 40    | 52.35                             | -5.65                                         | 28.63                                         |
| 50    | 63.05                             | 5.05                                          | 46.33                                         |
| 60    | 72.93                             | 14.93                                         | 62.68                                         |

NPV base case. Compared to the existing conventional fleet with low fuel consumption (10 km/l) and high (13.52 km/l), the BEP of Bajaj Qute RE60 will cut distance travelled at 190,670 km and 115,225 km, respectively. NPV of IDR 33,088,000 and IDR 80,841,000 will be obtained at the 60th month after the operation. IRR also enabled good scores, at 2.24% and 4.17%. If all parameters have not changed, the payback period will be accepted at the 46th and 26th months. Those indicators can be better if the monthly income flow is greater. It is obtained from the difference in running costs between RE60 and the existing fleet. The government can also provide subsidies for this transition program, or at least provide special bank interest so that all fundamental indicators are safe and resilient to the changes of input values.

Declarations

Author contribution statement

Muji Setiyo: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Eko Muh Widodo: Conceived and designed the experiments; Wrote the paper.

Muhammad Imron Rosyidi: Performed the experiments; Analyzed and interpreted the data.

Budi Waluyo, Zulfikar Bagus Pambuko & Norrefendi Tamaldin: Analyzed and interpreted the data; Wrote the paper.

Funding statement

This research was funded by the Ministry of Research, Technology, and Higher Education of the Republic of Indonesia through the Decentralization Research for University in 2019 that is managed by the Center of Research, Development, and Community Services of Universitas Muhammadiyah Magelang (Research Grant Number 023/ PDPUP- LP3M/I.3/AU/F/2019).

Competing interest statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.

Acknowledgements

The authors would like to thank the Management of PT Megalestari Mobilindo (Bajaj Distributor, Indonesia) for providing research facilities. Also, thank you to the Department of Transportation of Magelang City, Technicians, and Students who helped this research.

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