# Drawbacks of second-hand vehicles purchase by municipal companies[1]


**In the land transport enterprises the renovation of vehicles, apart from the determination of the revenue from sales and profit for the next years, is the second most important strategic problem to be resolved. In the urban public transport the vehicles replacement comes to the forefront. For trams and buses the operation of the same vehicles each next year results in greater and greater technical wear. The older are the operated vehicles, the lower is their value both registered in the operator's balance sheet as well as their price on the secondary market.**

*Text* **WOJCIECH BĄKOWSKI**

Three methods for vehicles renovation (replacement) are used in practice: purchase of new vehicles (loan, leasing, rental); purchase of second-hand vehicles; repair/refurbishment/modernisation of the own or purchased vehicles.

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*Streszczenie*

W niniejszym artykule autor analizuje wady kupowania używanego taboru. Jak zaznacza, im starszy tabor jest eksploatowany, tym mniejszą ma wartość, zarówno odnotowaną w bilansie operatora, jak i w cenie na rynku wtórnym. Zakupy nowego taboru bez wsparcia funduszami pomocowymi UE są bardzo skromne (1-3 proc. stanu inwentarzowego rocznie) i nie gwarantują w perspektywie nadchodzących lat pomniejszenia średniego wieku stanu taboru. Autobusy w wieku około 10 lat na zagranicznym rynku wtórnym są 10-krotnie tańsze od taboru nowego. Społecznym argumentem zakupu używanych autobusów jest zapewnienie pracy dla pracowników zaplecza technicznego. Wśród głównych wad wymienia się między innymi fakt, że operator dysponujący nadmiernie zużytym taborem z powodów ekonomicznych nie zdoła przez następne lata doprowadzić do stanu inwentarzowego, w którym nie będzie się eksploatować pojazdów kilkunasto- lub kilkudziesięcioletnich.

*Słowa kluczowe:* inwestycje taborowe, spółki komunalne, rynek wtórny

*Summary*

**Drawbacks of second-hand vehicles purchase by municipal companies**

In this paper the author analyses the drawbacks of buying second-hand vehicles. As he emphasises, the older are the operated vehicles, the lower is their value both registered in the operator's balance sheet as well as their price on the secondary market. Purchases of new vehicles without support of EU aid funds are very modest (1-3% of the inventory per year) and do not guarantee in the nearest years that an average vehicle age would be reduced. Buses of around 10 years of age on the foreign secondary market are 10 times cheaper than the new ones. A social argument to buy second-hand buses consists in ensuring the work for the technical maintenance staff. The main mentioned drawbacks include the fact that the operator having overly economically worn vehicles in the next years will not be capable to cope (to have an inventory situation, in which it will not be in a position to operate vehicles a dozen or so or a few dozen or so years old).

*Keywords:* investments in vehicles, municipal companies, secondary market


Photo Magdalena Wojtyła

*Zabrze, Plac Wolności tram stop*

years that an average vehicle age would be reduced. In the case of buses every year it would be necessary to buy 8-12% of the entire bus inventory (in the case of trams the demand is slightly lower, i.e. 5-7%). Municipal operators are not capable of financing so high expenditure even via long-term liabilities. Because of that in municipal bus entities most second-hand vehicles are purchased. Buses of around 10 years of age on the foreign secondary market are 10 times cheaper than the new ones. Apart from a low purchase price of used buses the attention is drawn to the possibility of using own technical facilities (space, technical equipment and professionals) to carry out any repairs, overhauls, modernisation, and even assembling. A social argument to buy second-hand buses consists in ensuring the work for the technical maintenance staff. Therefore the national inventory of buses serving the public transport comprises approx. 60% of buses on average approx. 14 years old. The situation with trams is similar, but the scale is different. An average age of operated trams is approx. 27 years, and in certain cities trams more than 40 years old are operated. Overhauls and modernisation of trams are carried out in the technical facilities, apart from servicing and running repairs. Worn out trams, manufactured in the 1980s (like in the city of Szczecin) are purchased intentionally, to modernise them using own resources or with the support of the external supplier.

The methods for bus and tram vehicles replacement, presented in a nutshell, based on the current economic calculation and social arguments, have several important drawbacks.

The most important negative is the delay of the entire transport system development in the introduction of so-called intelligent transport. Modernised or repaired vehicles comply with requirements specified in the road traffic regulations, but they are not equipped with electronic systems to interact with the traffic control system, to validate e-tickets, to provide dynamic passenger information, to use WiFi by passengers, to charge phones or to support drivers.

A high emission of exhaust gas polluting the air in the city is a drawback of obsolete buses.

The justification, that a substantial number of jobs is ensured in the own technical facilities is a sociological advantage, but it features significant weaknesses:

1) the repair and overhaul work does not require new knowledge from the staff and it is carried out using very old technology,
2) carried out repairs or modernisation are not covered by a warranty,
3) after the performed modernisation or overhaul the operated vehicles are subject to frequent evolutionary failures during the operation,
4) the vehicles operational unreliability contributes to the effect of excessive number of vehicles in the inventory (20-30% of vehicles are being serviced, repaired, overhauled, 'reconstructed', on stand-by),
5) worn or repaired vehicles have approx. 10-20% smaller annual mileage than the new ones,
6) occasional purchases of the second hand vehicles result in possessing in the inventory a few brands and types of buses and trams.

The specified organisational-technical phenomena of vehicles renovation by repairs (reconstruction) or purchases of second-hand vehicles translate into very unfavourable economic relationships in the field of capital, assets value, and costs. In the new trend of economics the enterprise activity effectiveness is evaluated on the basis of its worth changes, occurring during the economic activity. This value is determined by the tangible and intellectual capital. In the case of transport business the tangible value is determined by so-called working assets, i.e. the means of transport (buses, trams). The operator having an overly worn vehicles has the assets of nearly scrap value working for passengers. Such vehicles cannot generate the added value for passengers, i.e. meet ecological requirement, be 'intelligent' in the traffic, be more passenger and environment friendly. The assets of technical facilities are financed from a part of the operator's capital. A carrier-operator becomes a transport-repair and not a transport company.

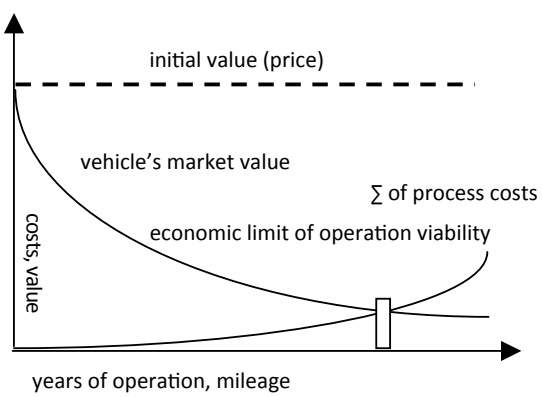


*Fig. 1 Relationships between the vehicle's value and process costs*

Photo MB


*The new hybrid vehicles have in their fleet, among others PKM Sosnowiec. Photo: Siemianowice Śląskie, Śląska street*

Processes occurring in its technical facilities – related to the procurement of materials, spare parts, payroll, energy or utilities consumption – require an appropriate amount of working capital, which makes the cash flows difficult. The liquidity reduction results in difficulties in the continuity of carrying out the repair and overhaul work (breaks occur in the planned scopes of work). The occurrence of failures in the transport process at a large inventory of worn vehicles increases the cost of not only the running repairs, but increases the process cost. The removal of a small failure, e.g. non-closing door of the vehicle, requires the arrival of a breakdown vehicle, temporary vehicle withdrawal from the operation, starting a reserve vehicle. A small failure shows a process of events, which generate additional, so-called process costs. The practice shows that a worn means of transport purchased at a low price (in particular this applies to buses) during two-three years of operation can generate total process costs exceeding its purchase price. In the 1970s an interesting model was developed, specifying permissible economic limit of lorries and buses operations. This limit is determined by equalling the vehicle market value with the total of incurred process costs from the beginning


Photo Sylwia Żywczok

*In the technical facilities, apart from the services and repairs of current trams, repairs and modernizations are carried out*

of a new vehicle operation. In motor transport enterprises those process costs include the cost of: running repairs, procurement logistics, breakdown vehicles maintenance, maintaining reserve vehicles, vehicles not in working order stoppage, failures removal. Process costs are sometimes higher than the cost of repair itself. The relationship between the process costs and the vehicle's market value determines the limit of economic viability of the vehicle operation (see Fig. 1).

The category of depreciation shall be considered besides the provided relationship. A new bus during the initial five years of operation generates depreciation costs (a tram has a longer period of depreciation charge), which have a positive impact on the operator's liquidity. During the initial two, three years the vehicle has a warranty and does not generate the running repair costs. Such situation results in significant reduction of repair work scope and the technical facilities concentrate only on servicing. The employment in the technical facilities substantially goes down, which has a systemic impact on the entire company cost cutting. At the same time the inventory of not working vehicles diminishes. In our county there are many carriers having buses on average 3-4 years old. They sell buses after seven years of operation on the secondary markets and – depending on the market and financial situation – pay this amount to lease or to buy a new bus (now companies start renting new vehicles).

An operator having a relatively new vehicles has a sound financial basis for continual replacement of vehicles. Instead, an operator having technically overly worn vehicles, during the next years (five, ten years) cannot achieve the inventory situation, in which buses of less than 10-12 years of age will not be operated (in the case of trams – 25 years old vehicles). We should remember that now this is the time of new transport technologies, IT based, creating an intelligent transport system, using hybrid and electric vehicles and new generations of trams. These new systemic solutions in the urban transport management will provide support to build smart cities (conurbations). ■

***Prof. Wojciech Bąkowski D.Sc.*** |
*Faculty of Management and Economics of Services, University of Szczecin*
*e-mail: wojciech.bakowski@wzieu.pl*

[1] A very similar scope of presented drawbacks of second-hand vehicles purchase applies to private carriers operating on the inter-regional transport market.