Considerations on Green Public Procurement of Coaches

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Received date: 27 February 2019; Accepted date: 3 May 2019; Published date: 23 August 2019

Abstract

The paper analyzes the features of green public procurement of coaches in Romania. The paper presents a model of a process of preparing the green procurement procedure in order to determine the award criteria. In the presented model, purchase prices need to be estimated and life cycle costs have to be calculated for the most representative types of coaches on the Romanian market. Through this study we aim to identify the relevant award criterion for the considered coaches.

Keywords: green public procurement, cost-per-life cycle, coach, purchase price.

Introduction

Green public procurement (GPP) aims to improve the economic sustainability and the environment.

Green public procurement is defined by the European Commission (2016b) as: "a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured ".

Public procurement is increasingly perceived as a means of improving sustainability. The United Nations Sustainable Development Agenda 2030 explicitly refers to the need of promoting sustainable procurement as a goal of sustainable development (UN, 2015).

Even if green public procurement has higher purchase prices, green products can help reduce costs. The European Commission (2016a) has considered green procurement as a way to save money, when costs are analysed from the life-cycle perspective, for
example through saved materials and energy, reduction of waste and pollution.

Green public procurement leads to the acquisition of "green", ecological products, whose environmental impact over the entire life cycle is lower compared to other comparable products or solutions (Ghisetti, 2017).

In other words, organizations have to choose products or services that are “healthier” or more “environmentally friendly”, promoting recycling, “green” buildings that operate with low energy (less polluting) and sustainable consumption (Buniamin et al., 2016).

Making decisions about purchasing green products requires clear, easy-to-understand assessment methods. Life Cycle Assessment Methods (LCA) have become increasingly important, although the use of assessment factors based on this method is limited (Parikka-Alhola and Nisinen, 2012).

Being the largest buyer in a country, the government has a significant influence on stimulating the use of green products and services in that country (Walker and Brammer, 2009).

The government is in a position to influence the demand for "environmentally friendly" products and can encourage businesses that involve green activities. (Buniamin et al., 2016).

Public authorities are major consumers in Europe: they spend about 1.8 trillion Euros each year, which represents about 14% of the European Union’s GDP. By using their purchasing power, public authorities can choose to purchase products and services with a low environmental impact, thus contributing to sustainable production and consumption. (European Commission, 2016b).

With the adoption of the new European Public Procurement Directives in 2014 for several categories of products, including motor vehicles, contracting authorities should consider energy / fuel consumption and the environmental impact of motor vehicles in the procurement process through life-cycle costing (European Commission, 2016a).

Regarding the green public procurement in Romania in 2018, the National Agency for Public Procurement (A.N.A.P.) issued Order no. 1068/ 04.10.2018 for the approval of the Green Public Procurement Guidelines. This order contains the minimum environmental protection requirements for certain groups of products and services that are requested from the bidders according to the tender specifications.

The purpose of these guidelines is to provide contracting authorities with minimum mandatory environmental protection requirements to be considered when developing the Green Public Procurement Documents. Through this guide for transport vehicles, the minimum requirements for environmental protection are CO2 emissions and pollution standard (Euro VI).

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The award criteria established by Law no. 98/2016 for a public procurement are the following: "lowest cost", "lowest price", "best cost-quality ratio" and "best price-quality ratio".

In green public procurement, most of the time the life cycle cost is a more relevant element to consider compared to the purchase price. There are products that, even if they have a low purchase price, they have higher operating and maintenance costs over the life cycle.

Some of my past research has shown that the life cycle cost is not always more relevant than the purchase price, and there are also cases where some products have the lowest purchase price but also the lowest life cycle cost.

In this study, we analysed the purchasing and life cycle costs for three representative coach models on the Romanian market, namely: Iveco Evadys, Mercedes-Benz Tourismo RH and Neoplan Tourliner. All three coach models meet the Euro VI pollution standard with low fuel consumption, thus complying with existing European environmental regulations.
The main expenses required for purchasing, operating and dismantling a coach in accordance with the public road traffic legislation are:

- purchase price;
- operating expenses that consist of:
  - RCA insurance type (compulsory car insurance);
  - CASCO insurance (optional insurance);
  - periodical technical inspections - ITP;
  - fuel costs;
- administrative charges related to public road traffic;
- maintenance costs that consist of:
  - annual technical inspections;
  - current repairs (after the warranty period, excluding consumables);
  - cost of tires;
  - various maintenance costs;
  - resale price after the exploitation period.

The purchase prices for the three standard coach models are shown in Table 1.

Table 1: Purchase prices for coach brands Iveco Evady, Mercedes-Benz Tourismo RH and Neoplan Tourliner

| Brand and coach type               | Purchase price (euro, excluding VAT) |
|------------------------------------|---------------------------------------|
| Iveco Evady                        | 220,000                               |
| Mercedes-Benz Tourismo RH          | 245,000                               |
| Neoplan Tourliner                  | 240,000                               |

Sources: http://www.ivecocr.cz/en/article/evady/prices, Retrieved on February 2, 2019; http://www.mercedes-benz-bus.com/ro_RO/buy/prices, Retrieved on February 3, 2019; http://www.neoplan.com/global/en/coaches/tourliner-overview/prices, Retrieved on February 2, 2019

The main common technical features of the three types of coaches are detailed in Table 2.

Table 2: Technical characteristics of the three brands of coaches Iveco Evady, Mercedes-Benz Tourismo RH and Neoplan Tourliner

| No. | Technical characteristics       | Iveco Evady | Mercedes-Benz Tourismo RH | Neoplan Tourliner |
|-----|---------------------------------|-------------|---------------------------|-------------------|
| 1   | Length                          | 12.9 m      | 13.1 m                    | 13.1 m            |
| 2   | Width                           | 2.55 m      | 2.55 m                    | 2.55 m            |
| 3   | Height                          | 3.46 m      | 3.68 m                    | 3.87 m            |
| 4   | Wheelbase                       | 7.06 m      | 6.9 m                     | 7.05 m            |
| 5   | Gross vehicle weight rating     | 19 t        | 19.5 t                    | 19.5 t            |
| 6   | Engine type                     | Cursor 9    | OM 936                    | MAN D2676         |
| 7   | Pollution standard              | Euro VI     | Euro VI                   | Euro VI           |
| 8   | Cylinder capacity               | 8.7 l       | 7.7 l                     | 12.4 l            |
| 9   | Horsepower                      | 294 kW      | 260 kW                    | 309 kW            |
|     |                                 | (400 CP)    | (348 CP)                  | (414 CP)          |
| 10  | Torque                          | 1,700 Nm    | 1,400 Nm                  | 2,100 Nm          |
| 11  | Fuel tank capacity /ad-blue     | 430 l / 50 l| 480 l / 40 l             | 550 l / 50 l      |
| 12  | Fuel consumption                | 26 l / 100 km| 24 l / 100 km            | 32 l / 100 km     |
| 13  | Tire size                       | 295/80 / R22.5| 295/80 / R22.5 | 295/80 / R22.5    |
The average distance a coach runs per month is approximately 10,000 km, and its lifespan is 5 years, therefore at the end of their life-cycle they must have run for about:

\[10,000 \text{ km/month} \times 60 \text{ months} = 600,000 \text{ km}\]

The warranty period for new coaches is of 2 years or 100,000 km. Based on the above estimation, any of the three coaches are under warranty for a period of 10 months.

### Table 3: RCA type insurance costs

| Type of coach       | Iveco Evadys | Mercedes-Benz Tourismo RH | Neoplan Tourliner |
|---------------------|--------------|---------------------------|-------------------|
| Annual insurance cost (euro, excluding VAT) | 1,350 | 1,400 | 1,600 |
| RCA insurance cost over the life cycle | 6,750 | 7,000 | 8,000 |

Source: https://asfromania.ro/informatii-publice/statistici/statistici-asigurari, Retrieved on January 21, 2019

- **Cost of CASCO insurance** (optional insurance)

The estimated costs of a CASCO insurance for the analysed coaches are shown in Table 4.

### Table 4: Cost of CASCO insurance

| Type of coach       | Iveco Evadys | Mercedes-Benz Tourismo RH | Neoplan Tourliner |
|---------------------|--------------|---------------------------|-------------------|
| Annual insurance cost for CASCO | 7,600 | 8,700 | 8,800 |
| CASCO insurance cost over the life cycle (euro, excluding VAT) | 38,000 | 43,500 | 44,000 |

Source: https://asfromania.ro/informatii-publice/statistici/statistici-asigurari, Retrieved on January 21, 2019

- **The cost of regular technical inspections - ITP**

Coaches are vehicles intended for the transport of people and their technical inspections are required every six months. The current cost of a periodical technical inspection is € 40, excluding VAT. Estimated costs of periodic technical inspections for coaches analysed are shown in Table 5.
Table 5: Costs of regular technical inspections

| Type of coach                  | Iveco Evadys | Mercedes-Benz Tourismo RH | Neoplan Tourliner |
|-------------------------------|--------------|---------------------------|-------------------|
| Annual Cost - ITP (euro, excluding VAT) | 80           | 80                        | 80                |
| ITP Cost over the life cycle (euro, excluding VAT) | 400          | 400                       | 400               |

Sources: http://www.ivecocr.cz/en/article/evadys/services, Retrieved on January 7, 2019; http://www.mercedes-benz-bus.com/ro_RO/buy/services, Retrieved on January 7, 2019; http://www.neoplan.com/global/en/coaches/services, Retrieved on January 8, 2019

- Fuel costs

The estimated costs of fuel for the analysed coaches are shown in Table 6. To compensate for price differences across the member states of transit, the average price of a liter of diesel is 1.10 euro, excluding VAT.

Table 6: Fuel costs

| Type of coach                  | Iveco Evadys | Mercedes-Benz Tourismo RH | Neoplan Tourliner |
|-------------------------------|--------------|---------------------------|-------------------|
| Fuel consumption (l / 100 km) | 26           | 24                        | 32                |
| Number of km per year (km)    | 120,000      | 120,000                   | 120,000           |
| Annual fuel consumption (l)   | 31,200       | 28,800                    | 38,400            |
| Annual fuel consumption cost (euro, excluding VAT) | 34,320      | 31,680                    | 42,240            |
| Cost of fuel over the lifecycle | 171,600     | 158,400                   | 211,200           |

Source: http://www.insse.ro/cms/ro/tags/buletin-statistic-de-preturi, Retrieved on January 19, 2019

- The cost of administrative charges on public roads

In order to travel on public roads, according to the legislation in force in Romania and the legislation in the European Community space it is necessary to pay various fees or charges for the transit of roads or motorways. The fees are the same for the three types of coaches compared, on average 70 euro, excluding VAT, for each transit country and 500 euro, excluding VAT, for Romania (validity 12 months, i.e. about 42 euro excluding VAT / month) - Source: transit fees in Romania and the EU. On average, each coach crosses 5 countries, 4 times a month, for which the necessary charges will be calculated. Estimated costs with the administrative fees are shown in Table 7.

Table 7: Costs with administrative charges

| Romania | Country 1 | Country 2 | Country 3 | Country 4 | Country 5 | Annual costs with administrative charges (euro, excluding VAT) |
|---------|-----------|-----------|-----------|-----------|-----------|---------------------------------------------------------------|
| euro/ Month | euro/ Transit | euro/ Transit | euro/ Transit | euro/ Transit | euro/ Transit | 18,816                                                      |
| 42      | 70        | 70        | 70        | 70        | 70        |                                                              |
| Costs with administrative charges per life cycle (euro, excluding VAT) | 94,080 |

Source: Authors’ conception
• **Cost of technical inspections**

According to the manufacturers, technical inspections for the three types of coaches are carried out every 80,000 km or once a year, depending on the first criterion achieved, technical being performed both during the warranty period and post-warranty period. Estimated costs for technical inspections are shown in Table 8.

| Type of coach       | Annual technical inspection or every 80,000 km (euro, excluding VAT) | Every 6 months (includes checking / charging air conditioning system) (euro, excluding VAT) | Replacing differential oil, gearbox and retarder (every 2 years) (euro, excluding VAT) | Total cost of technical inspections (euro, excluding VAT) |
|---------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------|
| Iveco Evadys        | 850                                                                    | 250                                                                            | 550                                                                            | 7,850                                                |
| Mercedes-Benz Tourismo RH | 711                                                                  | 210                                                                            | 500                                                                            | 6,655                                                |
| Neoplan Tourliner   | 950                                                                    | 300                                                                            | 550                                                                            | 8,850                                                |

**Table 8: Cost of technical inspections**

**Amount allocated to technical inspections per operating year (euro, excluding VAT)**

| Type of coach       | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total cost of technical inspections (euro, excluding VAT) |
|---------------------|--------|--------|--------|--------|--------|------------------------------------------------------|
| Iveco Evadys        | 1,350  | 1,900  | 1,350  | 1,900  | 1,350  | 7,850                                                |
| Mercedes-Benz Tourismo RH | 1,131  | 1,631  | 1,131  | 1,631  | 1,131  | 6,655                                                |
| Neoplan Tourliner   | 1,550  | 2,100  | 1,550  | 2,100  | 1,550  | 8,850                                                |

Sources: [http://www.ivecocr.cz/en/article/evadys/services](http://www.ivecocr.cz/en/article/evadys/services), Retrieved on January 7, 2019; [http://www.mercedes-benz-bus.com/ro_RO/buy/services](http://www.mercedes-benz-bus.com/ro_RO/buy/services), Retrieved on January 7, 2019; [http://www.neoplan.com/global/en/coaches/services](http://www.neoplan.com/global/en/coaches/services), Retrieved on January 8, 2019

• **Cost of current repairs**

Current repairs include replacements of consumables both in warranty and post-warranty periods. Replacement of spare parts, checks and estimated costs of current repairs are shown in Table 9.
### Table 9: Cost with current repairs

| Type of coach /Benchmark | Iveco Evadys | Mercedes-Benz Tourismo RH | Neoplan Tourliner |
|--------------------------|--------------|----------------------------|-------------------|
|                          | No. pieces   | Price per unit (euro, excluding TVA) | Total Value (euro, excluding VAT) | No. pieces   | Price per unit (euro, excluding VAT) | Total Value (euro, excluding VAT) | No. pieces | Price per unit (euro, excluding VAT) | Total Value (euro, excluding VAT) |
| brake paddles front axle | 6            | 310                        | 1,860             | 6            | 350                        | 2,100             | 6            | 400                        | 2,400             |
| rear brake pad plates    | 6            | 200                        | 1,200             | 6            | 300                        | 1,800             | 6            | 350                        | 2,100             |
| brake discs front axle   | 3            | 650                        | 1,950             | 3            | 650                        | 1,950             | 3            | 700                        | 2,100             |
| brake discs rear axle    | 3            | 1,200                      | 3,600             | 3            | 1,100                      | 3,300             | 3            | 900                        | 2,700             |
| valve 4 ways             | 1            | 450                        | 450               | 1            | 550                        | 550               | 1            | 400                        | 400               |
| clutch set               | 1            | 1,700                      | 1,700             | 1            | 1,550                      | 1,550             | 1            | 1,700                      | 1,700             |
| head bar head            | 1            | 150                        | 150               | 1            | 200                        | 200               | 1            | 200                        | 200               |
| various bulbs            | 1            | 50                         | 50                | 1            | 50                         | 50                | 1            | 50                         | 50                |
| set front axle cushion set | 1       | 1,100                      | 1,100             | 1            | 1,300                      | 1,300             | 1            | 1,100                      | 1,100             |
| wheel geometry           | 1            | 80                         | 80                | 1            | 170                        | 170               | 1            | 200                        | 200               |
| Total cost of current repairs (euro, excluding VAT) | - | - | 12,140 | - | - | 12,970 | - | - | 12,950 |
| Annual cost of current repairs (euro, excluding VAT) | - | - | 2,428 | - | - | 2,594 | - | - | 2,590 |

Sources: [http://www.ivecocr.cz/en/article/evadys/services](http://www.ivecocr.cz/en/article/evadys/services), Retrieved on January 7, 2019; [http://www.mercedes-benz-bus.com/ro_RO/buy/services](http://www.mercedes-benz-bus.com/ro_RO/buy/services), Retrieved on January 7, 2019; [http://www.neoplan.com/global/en/coaches/services](http://www.neoplan.com/global/en/coaches/services), Retrieved on January 8, 2019

- **Cost of tyres**

The tires of the analysed coaches are used predominantly extra-urban, their average operational life being 5 years or 50,000 km. The average price of a medium-size tire is 260 euro excluding VAT. Since the three compared coaches are equipped with tires of the same type and size, the cost is the same as follows:

\[(6 \text{ tires} \times 260 \text{ euro excluding VAT}) \times 12 \text{ sets} = 18,720 \text{ euro excluding VAT } / \text{ life cycle}\]

Taking into account the fact that tire replacement is carried out every 50,000 km and coaches run 120,000 km/year, we have the following annual costs of tires (Table 10).

### Table 10: Annual cost of tires

| Annual cost of tires (euro, excluding VAT) | Annual cost of tires (euro excluding VAT) |
|-------------------------------------------|-------------------------------------------|
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | |
| 3,120  | 3,120  | 4,680  | 3,120  | 4,680  | 18,720 |

Sources: [http://www.dinamic92.ro/anvelope/category.php?id_category=71646](http://www.dinamic92.ro/anvelope/category.php?id_category=71646), Retrieved on January 11, 2019; [https://www.anveloshop.ro/anvelope-autobuze-autocare](https://www.anveloshop.ro/anvelope-autobuze-autocare), Retrieved on January 12, 2019; [https://premiumanvelope.ro/118-anvelope-29580-r225-cauciucuri-295-80-225](https://premiumanvelope.ro/118-anvelope-29580-r225-cauciucuri-295-80-225), Retrieved on January 11, 2019
I. Different maintenance costs

During the operation of coaches, there are other maintenance costs to be considered, such as tachograph calibrations, wheel pressure checks, coach washes, oil and antifreeze refilling, cleaning solutions, etc. The maintenance costs are the same for the three types of coaches, their annual value being 350 euro, excluding VAT (Source: Average costs declared by Romania authorized dealers of coach manufacturers):

350 euro, excluding VAT x 5 years = 1,750 euro excluding VAT / life cycle.

The legal provisions in force state that all annual costs related to the operation and maintenance of coaches will be taken into account in the life cycle cost calculation, then applying a discount rate for that year, so that all costs are calculated in the year of the purchase.

By the joint Order of the president of A.N.A.P. and the President of the National Prognosis Committee no.1170 / 2017, the discount rate used in 2018 for awarding contracts using the criteria "lowest cost" as the award criteria is 4.5%.

The total operating and maintenance costs for the Iveco Evadys coach are detailed in Table 11. In this table, but also in tables 12 and 13, the discount factor was calculated over the 5 years of operation according to formula 1 / (1 + a)^n, where a is the discount rate and n = 1, 2, ..., 5.

| Table 11: The total operating and maintenance costs for the Iveco Evadys coach |
|-----------------------------------|---|---|---|---|---|
| Year / Cost (euro, excluding VAT) | 1  | 2  | 3  | 4  | 5  |
| Cost of RCA insurance             | 1,350  | 1,350 | 1,350 | 1,350 | 1,350 |
| Cost of CASCO insurance           | 7,600  | 7,600 | 7,600 | 7,600 | 7,600 |
| Cost of regular technical inspections | 80  | 80  | 80  | 80  | 80  |
| Cost of fuel                      | 34,320 | 34,320 | 34,320 | 34,320 | 34,320 |
| Cost of administrative fees       | 18,816 | 18,816 | 18,816 | 18,816 | 18,816 |
| Cost of technical inspections     | 1,350  | 1,900 | 1,350 | 1,900 | 1,350 |
| Cost of current repairs           | 2,428  | 2,428 | 2,428 | 2,428 | 2,428 |
| Cost of tyres                     | 3,120  | 3,120 | 4,680 | 3,120 | 4,680 |
| Cost of different maintenance expenses | 350  | 350  | 350  | 350  | 350  |
| Operating and maintenance costs   | 69,414 | 69,964 | 70,974 | 69,964 | 70,974 |
| Discount rate for a = 4.5%        | 0.957  | 0.916 | 0.876 | 0.839 | 0.802 |
| Updated operating and maintenance costs | 66,429 | 64,087 | 62,173 | 58,700 | 56,921 |
| Total discounted operating and maintenance costs | 308,310 |

Source: Authors’ conception

The total discounted operating and maintenance costs for the Mercedes-Benz Tourismo RH coach are detailed in Table 12.

| Table 12: The total discounted operating and maintenance costs for the Mercedes-Benz Tourismo RH coach |
|-----------------------------------|---|---|---|---|---|
| Year / Cost (euro, excluding VAT) | 1  | 2  | 3  | 4  | 5  |
| Cost of RCA insurance             | 1,400  | 1,400 | 1,400 | 1,400 | 1,400 |
| Cost of CASCO insurance           | 8,700  | 8,700 | 8,700 | 8,700 | 8,700 |
| Cost of regular technical inspections | 80  | 80  | 80  | 80  | 80  |

Ionel PREDA and Doina I. POPESCU (2019), Journal of Eastern Europe Research in Business and Economics, DOI: 10.5171/2019.139043
The total discounted operating and maintenance costs for Neoplan Tourliner are detailed in Table 13.

**Table 13: The total discounted operating and maintenance costs for the Neoplan Tourliner coach**

| Year / Cost (€, excluding VAT) | 1   | 2   | 3   | 4   | 5   |
|-------------------------------|-----|-----|-----|-----|-----|
| Cost of RCA insurance         | 1,600| 1,600| 1,600| 1,600| 1,600|
| Cost of CASCO insurance       | 8,800| 8,800| 8,800| 8,800| 8,800|
| Cost of regular technical inspections | 80 | 80 | 80 | 80 | 80 |
| Cost of fuel                  | 42,240| 42,240| 42,240| 42,240| 42,240|
| Cost of administrative fees   | 18,816| 18,816| 18,816| 18,816| 18,816|
| Cost of technical inspections | 1,550| 2,100| 1,550| 2,100| 1,550|
| Cost of current repairs       | 2,590| 2,590| 2,590| 2,590| 2,590|
| Cost of tyres                 | 3,120| 3,120| 4,680| 3,120| 4,680|
| Cost of different maintenance expenses | 350 | 350 | 350 | 350 | 350 |
| Operating and maintenance costs | 79,146| 79,696| 80,706| 79,696| 80,706|
| Discount rate for \(a = 4.5\%\) | 0.957| 0.916| 0.876| 0.839| 0.802|
| Updated operating and maintenance costs | 75,743| 73,002| 70,698| 66,865| 64,726|
| Total discounted operating and maintenance costs | 351,034 |

Source: Authors’ conception

- **Resale price after the exploitation period**

After studying the online sales sites in Romania, based on coach brand, model, age and number of kilometers, we found out that for each year of operation, the resale price dropped by an average of 14% for a properly maintained coach. At the end of its service life, the resale price is deducted from the lifetime cost as this value is received by the current owner of the coach from the next owner, following the completion of the sale-purchase process.

The resale prices after the exploitation period are shown in Table 14.
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The main elements of the lifetime cost for the three coaches analysed, as well as the purchase prices, are presented in Table 15.

Table 15: Lifecycle costs and purchase prices for Iveco Evadys, Mercedes-Benz Tourismo RH and Neoplan Tourliner coaches

| No. | Price/cost (euro, excluding VAT) | Iveco Evadys | Mercedes-Benz Tourismo RH | Neoplan Tourliner |
|-----|---------------------------------|--------------|---------------------------|-------------------|
| 1   | Purchase price                  | 220,000      | 245,000                   | 240,000           |
| 2   | Total discounted operating and maintenance costs | 308,310  | 301,449                  | 351,034           |
| 3   | Resale price after the exploitation period | 66,000 | 73,500                   | 72,000            |
|     | Coach cost per life cycle       | 462,310      | 472,949                   | 519,034           |
|     | Cost per kilometre (euro, excluding VAT) | 0.7705 | 0.7882                   | 0.8650            |

Source: Authors’ conception

From the analysis of the data in the table above, it can be seen that if the award procedure had been carried out using the “lowest price” award criteria, the ranking would be as shown in Table 16.

Table 16: Ranking for the “lowest price” award criteria

| Award criteria | Lowest price |
|----------------|--------------|
| No.            | Coach Brand  | Position in Ranking | Purchase Price (euro, excluding VAT) |
| 1              | Iveco Evadys | 1st place            | 220,000                                  |
| 2              | Neoplan Tourliner | 2nd place             | 240,000                                  |
| 3              | Mercedes-Benz Tourismo RH | 3rd place             | 245,000                                  |

Source: Authors’ conception

If the award procedure had been carried out using the “lowest cost” award criteria, the ranking would be as shown in Table 17.
Table 17: Ranking for the “lowest cost” award criteria

| Award criteria | Lowest cost | Life cycle cost (euro, excluding VAT) |
|----------------|-------------|-------------------------------------|
| No. | Coach Brand | Position in Ranking |                             |
| 1 | Iveco Evadys | 1st place | 462,310 |
| 2 | Mercedes-Benz Tourismo RH | 2nd place | 472,949 |
| 3 | Neoplan Tourliner | 3rd place | 519,034 |

Source: Authors’ conception

The purchase prices and life cycle costs presented in Tables 16 and 17 are graphically represented in Figure 1.

![Figure 1: Graphic representation of purchase prices and life cycle costs](image)

It can be seen that the **Iveco Evadys ranks first both for the "lowest price" and the "lowest cost" award criteria.**

In the study, it is clear that the Iveco Evadys model, both in terms of price and life cycle cost, would be the winner of the award procedure.

In contrast, for the other two models, namely Mercedes-Benz Tourismo RH and Neoplan Tourliner, the life cycle cost criteria is more relevant than the purchase price.

As a result, in the process of preparing the green procurement procedure to determine the award criteria, purchase prices need to be estimated and lifecycle costs have to be calculated for the most representative types of coaches on the market.

**Conclusions**

The article presents a comparative study on the acquisition of three types of coaches that are representative of the Romanian market, including a calculation of the life cycle costs and a comparison of the purchase rankings in case the award criteria would have been the lowest purchase price or the cost per smallest life cycle.

The study conducted has shown that Iveco Evadys coach model presents both the lowest price and the lowest life cycle cost. In contrast, in the case of the other two models, Mercedes-Benz Tourismo RH and Neoplan Tourliner, the study demonstrates the ranking of the procedure would have changed if the award criteria had been the...
lowest life cycle cost instead of the lowest purchase price.
In order to choose the most appropriate award criteria, before initiating the procedure, calculations should be performed on the basis of both the purchase price and the life cycle cost.

This analysis also shows that the life cycle cost is relevant when purchasing coaches. This conclusion is in line with part of the definition of green public procurement given by the EU and other authors.

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