

Procurement of hybrid electric buses

City of Oradea (Romania)

Background

The Romanian government is committed to reducing greenhouse gas (GHG) emissions by at least 40% by 2030 compared to 1990 while achieving a 27% improvement in energy efficiency. To achieve these goals, the Ministry of Environment and the National Agency for Public Procurement have provided guidelines for procurers by defining a number of criteria that can be applied by public authorities. The criteria aim to reduce GHG emissions and the environmental impact of the goods and services procured.¹

Transport is a major source of CO₂ emissions and other pollutants (such as NO_x, other GHG emissions, and particulate matter (PM)). To reduce these environmental and climate impacts, Romania has initiated actions to reduce air pollution in big cities. These measures include encouraging the use of public transport and modernising the public transport fleets through the procurement of less polluting vehicles.

The City of Oradea, a city of 200,000 inhabitants in the west of Romania, has used these criteria in their recent procurement of hybrid buses for public transport. Financial support for this procurement was obtained through the [EU Regional Operational Programme](#) (2014-2020).

Procurement objectives

In 2020, the City of Oradea sought to procure 15 hybrid buses for urban passenger transport. The goal of the procurement (which was an 'open procedure') was to reduce the harmful environmental impact of public transport vehicles.

The City chose hybrid buses as a technically mature solution that was most suitable compared to the space and maintenance requirements of other options, such as trolley buses or buses using compressed natural gas (CNG).



¹ <http://anap.gov.ro/web/wp-content/uploads/2018/11/ORDIN-Nr-1068-Achizitii-verzi.pdf>
http://anap.gov.ro/web/wp-content/uploads/2020/02/ghid-Catalog_factori_produce_ANAP.pdf

Criteria used

Subject matter of the contract:

Procurement of 15 hybrid buses with electric drive and diesel motor compliant with [Euro VI emission standards](#), for urban passenger transport in Oradea.

Minimal technical requirements:

The supplied buses were required to comply with a range of technical requirements for the mechanics and design of the buses to be considered for evaluation. Tenderers were asked to submit detailed technical specifications for the bus models provided in their bid, including proof that these comply with general EU and Romanian health and safety regulations. The specifications required medium capacity buses (minimum 90 passengers, 26 seated), with a lowered floor and equipped with a hybrid propulsion system including a diesel engine with free suction meeting EURO VI emission standards and an electric motor.

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The winning bidder had to commit to performing any necessary maintenance work during the warranty period.

Award criteria:

The contract was awarded on the basis of most economically advantageous tender (MEAT). All bidders that could fulfil the minimal technical requirements were evaluated using a point-based system. The best price offered could achieve a maximum of 60 points, while the technical proposal could achieve a maximum of 40 points. The tender was awarded to the bidder which reached the highest number of points in total.

The points for environmental criteria within the technical proposal could be achieved as follows:

- Average fuel consumption according to the Standardised on-road test cycles (SORT) test 2 for Hybrid vehicles (standardised on road test cycles following the International Association of Public Transport - UITP - methodology, to be certified by an officially recognised certification body) – 4 points for the lowest fuel consumption offered with fewer points awarded relative to the best offer;
- Environmental impact (please see further below for more information) during the operational lifespan of 800,000 km according to GEO no.40/20.04.2011², (expressed in Euro): 3 points for the bid with the lowest environmental impact; fewer points are awarded relative to best offer;
- Time allocated for planned technical overhauls (no. hourly averages per year) – 4 points for the lowest number of hours planned; fewer points awarded relative to best offer;
- Ratio between useful mass and total mass (mass factor) 4 points for the highest ratio of useful mass to total mass; fewer points awarded relative to best offer;
- Transport capacity – 3 points for the maximum transport capacity offered, bids above 135 people were not accepted, fewer points awarded relative to best offer;
- Warranty period - 3 points for highest warranty period offered (minimum of 48 months as per technical specifications, positive evaluation up to 96 months), fewer points awarded relative to highest offer. Each year assumes an average use of 70,000km per vehicle;
- Ratio between engine power and cylinder capacity – 5 points for the highest ratio between the engine power (kW) and the cylindrical capacity (in litres), lower points awarded in relation to highest offer.

² This is the Romanian transposition of Directive 2009/33/EC of the European Parliament and of the Council of 23.04.2009 on the promotion of clean road transport vehicles and energy efficiency.

The award criterion *energy and environmental impact during the lifespan*, includes the energy consumption, CO₂ emissions, NO_x, NMHC and PM produced by the vehicles. Oradea asked tenderers to demonstrate the impact level of the bus model offered by presenting results from the [SORT 2 \(Standardised on Road test\) for hybrid \(urban\) vehicles](#) issued by an EU accredited body. The results have to be calculated according to the model recommended by the [International Association of Public Transport](#) and the [European Automobile Manufacturers' Association](#).

Results

The tenderer received one bid (by Mercedes Benz Trucks and Buses Romania SRL), who could fulfil the environmental requirements and offer reduced fuel consumption. The contract volume was about €4.7 million.

Hybrid buses have proven to not only have environmental benefits in terms of GHG emissions and air pollutants, but they also have an overall higher fuel efficiency which will result in cost savings for Oradea City. The new buses consume 33,25l per 100km, instead of 40l previously. This results in annual savings of about €62,000.

Environmental impacts

The environmental impacts of road transport and public transport fleets are mainly CO₂, NO_x and PM emissions during their use phase. Particularly in larger cities, air pollution is a key public health and environmental concern.

In 2017, Oradea Transport Local (OTL) buses covered a total of 3,996,000 kilometres, with 47% of the fleet meeting the EURO 3 pollution standard, 33% the Euro 5 standard and 16% of buses EURO 2. The average number of kilometres travelled by a bus is approximately 547,000 kilometres/year, which corresponds to total GHG emissions of 10,554 tCO₂e for a fleet of 15 buses.

By replacing old buses with new hybrid ones (diesel electric), following the purchase of 15 buses and maintaining the same annual average route (to be able to use the same reference for comparison), 8,503 tCO₂e per year will be emitted leading to a relative decrease of 19.4% in GHG emissions. The calculation methodology was based on the JASPERS GHG Emission Calculation Tool (version 1).

Thanks to the procurement of hybrid electric diesel buses, the City of Oradea was able to reduce emissions which harm the environment, public health, contribute to climate change, and negatively affect air quality in large cities.

Lessons learned

The City of Oradea plans to continue its investments in greener public services and infrastructure, as these not only help the City to achieve climate and pollution targets but also reduce operating costs. However, in future procurements, the City would prefer to use life cycle cost calculation as an award criterion, to ensure minimal fuel consumption while also ensuring longevity of the buses.

Due to the good experience with hybrid and electric buses, several Romanian cities have procured these buses for their public transport fleets to reduce pollution and to provide cleaner air for citizens. According to Romania's [National Agency for Public Procurement](#), over 90 contracting authorities have procured electric or hybrid buses so far, totalling more than €190 million euro in contract value.

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For related information, please see [European GPP criteria for Road Transport](#) and the [Technical Background Report](#).