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# THE INFLUENCE OF PUBLIC TRANSPORT ELECTRIFICATION ON THE EUROPEAN URBAN BUS MARKET, WITH A SPECIAL EMPHASIS ON POLAND

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## Abstract

**Purpuse.** Cities across Europe are intensifying efforts to implement sustainable development goals, with a key focus on reducing external costs generated by the transport sector. The main objective of this article is to assess the impact of the ongoing electrification of bus fleets in European cities on the structure of the European urban bus market. Particular attention is given to the Polish urban bus market, which plays a significant role on both the supply and demand sides of the European market.
**Methodology.** The analysis is based on secondary data from the years 2020–2023, sourced from industry reports and publications by market monitoring institutions. The study employs the Herfindahl-Hirschman Index (HHI) and the C4 index to measure market concentration and the dominance of leading manufacturers.
**Findings.** The findings show that European manufacturers maintain a strong position in the conventional bus segment, which translates into their dominance in the overall market. However, in the electric bus segment, the market share of non-EU companies, particularly Chinese firms, is growing. Current trends related to the electrification of bus fleets in European cities may lead to a further increase in their significance at the expense of manufacturers from EU member states.

**Keywords:** electric buses, urban bus market, HHI

**JEL classification**: L92, Q42, R48.

## Introduction

A global shift away from conventional vehicles toward zero-emission vehicles is currently underway, a trend that is particularly evident in China and EU countries (Agbesi et al., 2023; Transport and Environment, 2018). Among all types of road vehicles, city buses are especially well-suited for electrification (Göhlich et al., 2018; Transport and Environment, 2018). This is because they operate on fixed routes with regular, predetermined timetables (Mulley et al., 2021; Schiewe, 2020; Wyszomirski, 2008) which facilitates planning the charging process to ensure reliable operation while minimizing the risk of a complete battery discharge (Borén,

2020; Mahmoud et al., 2016). Moreover, electric vehicles produce significantly less noise pollution compared to conventional vehicles, and they generate no tailpipe emissions at the point of operation. This makes electric city buses particularly well-suited for lines serving central urban areas (Basma et al., 2022; Jagiełło, 2021). Another argument in favor of electrifying city buses is the high efficiency of electric motors and their suitability for the specific demands of urban traffic (Alanazi, 2023; Mahmoud et al., 2016). The operational characteristics of city buses, which include frequent braking and stopping at bus stops, enable the effective use of regenerative braking (Al-Ogaili et al., 2021; Bartłomiejczyk & Kołacz, 2020). Furthermore, when buses are stopped, electric motors do not consume energy, unlike internal combustion engines, which idle and thus generate additional energy losses and associated costs. As a result, in urban traffic conditions, electric buses demonstrate five to seven times higher energy efficiency compared to their conventional counterparts (California Air Resources Board, 2018). Due in part to these advantages, more electric buses were registered in the EU-27 during 2022–2023 than in the entire preceding decade (Chatrou CME Solutions, 2024).

The shift in powering city buses from liquid (mainly ON) and gaseous fuels (mainly CNG) toward electric energy entails numerous micro-level consequences, primarily affecting individual bus companies. These include the need to build charging infrastructure, adjust bus schedules and routes to the characteristics of electric buses, change energy suppliers, adapt the bus company to changes in the cost structure and timing of certain expenditures and costs, as well as prepare processes related to the recycling and second-life use of traction batteries (Hasan et al., 2020; Rodrigues & Seixas, 2022; Tesar et al., 2020). On the other hand, changing the power supply method for city buses also brings about numerous macro-level consequences for the entire economy, including the automotive sector and related industries. Among the most significant macro-level consequences are:

- An increase in demand for electric vehicle components, mainly batteries and electric motors,
- An increase in demand for raw materials used in the production of electric vehicles, such as lithium, cobalt, nickel, or copper,
- A decrease in demand for liquid fuels and other petroleum-based products,
- The need to develop energy infrastructure,
- Changes in the labor market structure, including the creation of new jobs in sectors related to electromobility (e.g., battery production, electric vehicle manufacturing, and charging infrastructure), accompanied by a reduction in employment in the traditional automotive industry,
- A growing importance of companies possessing the know-how, processes, and production lines dedicated to the manufacturing of electric vehicles,
- Changes in public finances, resulting from decreased revenues from excise taxes on liquid fuels, alongside increased expenditures on subsidies for electric vehicles.

The scale of these macro-level changes also affects the existing structure of the automotive market, including the city bus segment. Changing conditions in the automotive industry contribute to declining competitiveness for some enterprises while simultaneously increasing the competitiveness of others. This is because previously held competitive advantages in the conventional bus segment are losing significance when competing in the electric vehicle market. The primary objective of this article is to assess the impact that the ongoing electrification of bus transport has had on the structure, dynamics, and development trends of the European city bus market. Special attention is given to the Polish city bus market, which has so far played a very significant role within the European market, both on the demand and supply sides (Jagiełło, 2018). This evaluation is based on a review of market data and the use of the most popular market concentration indicators.

## 1. The European Electric Bus Market

The data presented in Table 1 illustrate how rapidly the share of electric buses in the European city bus market has grown in recent years. These figures show that electric buses currently account for over 40% of newly registered city buses, which is nearly a threefold increase compared to 2020. What is more, in 2023, for the first time, European cities purchased more electric buses than conventional ones (Ruiz Pablo & Serrano José, 2024). Given the current political and legal conditions, a continued dynamic increase in the share of electric buses in the city bus market can be expected, accompanied by a marked decline in the importance of conventional buses. Indeed, many countries in Europe and worldwide have already declared an intention to achieve a 100% share of zero-emission buses in newly acquired urban fleets within the next 5–10 years (Momentum, 2023). Additional pressure in this regard, including on countries that have so far invested minimally in zero-emission vehicles, will be exerted by initiatives such as the European Green Deal, the "Fit for 55" package, and the "Clean Vehicles Directive".

**Table 1.** Share of the electric bus segment in the European city bus market (EU27 + UK + ICE + NO + CH)

| Year | Number of Registered Electric Buses | Year-over-Year Trend [%] | Share in Bus Market [%] | Total City Buses Registered |
|---|---|---|---|---|
| 2012 | 15 | - | 1,1 | 1319 |
| 2013 | 15 | +0 | 1,0 | 1467 |
| 2014 | 24 | +60 | 2,5 | 954 |
| 2015 | 101 | +320 | 5,5 | 1839 |
| 2016 | 259 | +156 | 12,8 | 2030 |
| 2017 | 368 | +42 | 13,5 | 2724 |
| 2018 | 548 | +49 | 16,4 | 3340 |
| 2019 | 1687 | +207 | 28,5 | 5927 |
| 2020 | 2062 | +22 | 24,7 | 8338 |
| 2021 | 3282 | +59 | 33,4 | 9813 |
| 2022 | 4152 | +26 | 43,5 | 9543 |
| 2023 | 6354 | +53 | 47,2 | 13466 |

Source: (Chatrou CME Solutions, 2024)

Table 2 presents data on the largest manufacturers of electric buses in the European city bus market. According to these data, in 2023, MAN was the largest supplier of electric buses in Europe. However, it should be noted that a year earlier, the company ranked ninth, and two years earlier, tenth. Given the significant impact that a single or a small number of successful tenders for supplying large numbers of vehicles to major city bus systems in Europe can have on a manufacturer's position in the ranking, it seems justified to pay particular attention to data covering a longer timeframe when conducting a market analysis of individual companies. Based on data for the entire 2020–2023 period, it can be concluded that Solaris was the largest electric bus manufacturer in the European market, followed by BYD-ADL, Yutong, and BYD.

**Table 2.** The Largest Electric Bus Manufacturers in the European City Bus Market

| Electric bus manufacturer | 2023 | 2022 | 2021 | 2020 | 2020-2023 | 2020–2023 market share [%] |
|---|---|---|---|---|---|---|
| MAN | 785 | 230 | 134 | 25 | 1174 | 9,1 |
| Solaris | 725 | 342 | 390 | 416 | 1873 | 14,5 |
| Yutong | 483 | 479 | 303 | 164 | 1429 | 11,1 |
| Wrightbus | 469 | 112 | - | - | 581 | 4,5 |
| BYD-ADL | 448 | 465 | 375 | 190 | 1478 | 11,4 |
| Mercedes | 446 | 405 | 333 | 99 | 1283 | 9,9 |
| BYD | 358 | 322 | 257 | 424 | 1361 | 10,5 |
| Iveco Bus | 356 | 347 | 274 | 114 | 1091 | 8,4 |
| Volvo Buses | 345 | 232 | 211 | 217 | 1005 | 7,8 |
| Zhongtong | 249 | - | - | - | 249 | 1,9 |
| Zonson | 232 | - | - | - | 232 | 1,8 |
| Irizar | 211 | 110 | 201 | 25 | 547 | 4,2 |
| Karsan | - | 135 | 36 | 23 | 194 | 1,5 |
| Golden Dragon | - | 133 | 53 | - | 186 | 1,4 |
| Ebusco | - | - | 132 | 109 | 241 | 1,9 |
| Total | 5107 | 3312 | 2699 | 1806 | 12924 | 100 |

Source: Own elaboration based on: (Sustainable Bus, 2022, 2023, 2024)

From the perspective of this article's topic, not only the sales volume of individual electric bus manufacturers is relevant, but also their country of origin. Table 3 presents data on the country of origin for the largest electric bus manufacturers operating in European cities, along with their market shares in individual years. These data indicate that, in the European market, the largest shares are held by companies from China, Germany, Spain, and the United Kingdom.

**Table 3.** Country of Origin of the Largest Electric Bus Manufacturers in the European Market

| Electric Bus Manufacturer | Country of Origin | Market share [%] | | | |
|---|---|---|---|---|---|
| | | 2023 | 2022 | 2021 | 2020 |
| Yutong | China | 7.6 | 11.5 | 9.2 | 7.4 |
| BYD | China | 5.6 | 7.8 | 7.8 | 19.2 |
| Zhongtong | China | 3.9 | – | – | – |
| Zonson | China | 3.7 | – | – | – |
| Golden Dragon | China | – | 3.2 | 1.6 | – |
| BYD-ADL | China (BYD) and the UK (Alexander Dennis Limited) | 7.0 | 11.2 | 11.4 | 8.6 |
| Wrightbus | UK | 7.4 | 2.7 | – | – |
| Irizar | Spain | 3.3 | 2.6 | 6.1 | 1.1 |
| Solaris | Spain/Poland | 11.4 | 8.2 | 11.9 | 18.8 |
| Ebusco | The Netherlands | – | – | 4.0 | 4.9 |
| MAN | Germany | 12.4 | 5.5 | 4.1 | 1.1 |
| Mercedes | Germany | 7.0 | 9.8 | 10.1 | 4.5 |
| Volvo Buses | Sweden | 5.4 | 5.6 | 6.4 | 9.8 |

| | | | | | |
|---|---|---|---|---|---|
| Karsan | Turkey | – | 3.3 | 1.1 | – |
| Iveco Bus | Italy | 5.6 | 8.4 | 8.3 | 5.2 |

Source: Own elaboration based on: (Sustainable Bus, 2022, 2023, 2024)

When analyzing the European city bus market, it is important to note that it is not homogeneous. This is because individual European countries have pursued significantly different fleet policies in recent years. Figure 1 illustrates how much these countries differ in the degree of priority given to zero-emission buses in their cities' fleet policies. It shows that in countries such as Norway and Slovenia, 100% of newly purchased city buses were zero-emission electric buses in 2023. On the other hand, in Estonia, electric buses accounted for only 8% of new purchases, with diesel buses making up 92%. The extent to which the size of individual national markets and the fleet policies adopted in particular countries influence investments in electric buses is well illustrated by the data on the number of electric buses purchased between 2012 and 2023. These data indicate that the largest number of electric buses was purchased in the UK (3,041), Germany (2,562), and France (1,978). Together, these fleets account for 39.9% of all electric buses in operation in Europe (Chatrou CME Solutions, 2024). Meanwhile, the smallest electric bus fleets are found in Hungary (172), Switzerland (284), and Bulgaria (298) (Chatrou CME Solutions, 2024). Collectively, these three countries account for 4.8% of the European electric bus fleet.

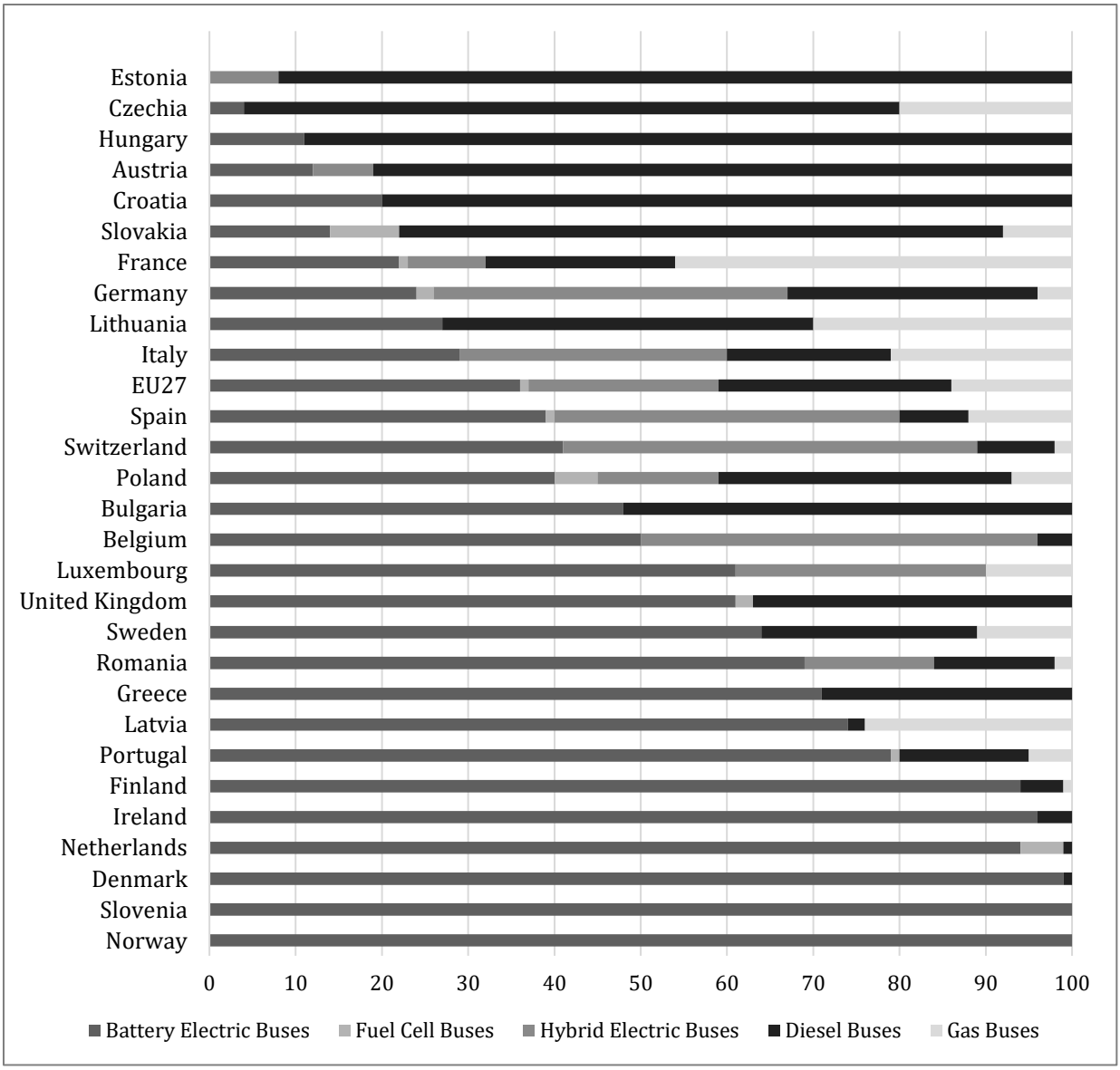


**Figure 1.** Share of Different Types of City Buses in the Markets of Individual EU Countries in 2023

Source: (Molliere, 2024)

## 2. The Polish Electric Bus Market in the European Context

As shown by the data in Figure 1, in 2023, the share of newly purchased electric buses by Polish cities exceeded that of conventional buses. This made it possible to achieve a ratio of electric to conventional buses at a level comparable to the EU average. Table 4 presents data on the market share of individual manufacturers in the total fleet of electric buses operated in Polish cities. It indicates that the Polish electric bus market is significantly more concentrated compared to the European market. In the literature, the most popular measures of market concentration are the C4 index (calculated as the combined share of the four companies with the highest market share) and the Herfindahl-Hirschman Index (HHI), calculated as the sum of the squared market shares of each company (Carlton & Perloff, 2015). For the Polish electric bus market, the C4 concentration ratio was 79.3%, whereas for the European market in the years 2020–2023, the C4 value was 47.5%. The much higher concentration in Poland's electric bus market relative to Europe is also reflected in the Herfindahl-Hirschman Index (HHI). In Poland,

this index amounted to around 3799 points, whereas in the European market it was approximately 940 points. The Herfindahl-Hirschman Index ranges from [10000/N, 10000], where N is the number of companies in the market. The actual values of HHI for a given market are interpreted as follows (Kwiatkowska Ewa, 2014):

- A value below 1000 indicates low market concentration,
- A value between 1000 and 1800 indicates moderate market concentration,
- A value between 1800 and 2500 indicates high market concentration,
- A value above 2500 indicates very high market concentration, approaching an oligopoly,
- A value close to 10000 indicates a pure monopoly.

Comparing the HHI values for the Polish and European electric bus markets in the context of theoretical interpretations reveals that while the European market has a low level of concentration, the Polish market demonstrates a high degree of concentration. The high concentration of the Polish market primarily results from the dominant market position of Solaris. This dominance stems from the fact that Solaris was among the first companies to introduce electric buses into its portfolio and remains one of the few manufacturers producing electric buses that can be charged via in-motion charging (IMC) (Jagiełło, 2016). Furthermore, before the Spanish group CAF acquired a 100% stake in 2018, Solaris was founded and developed by Polish owners, which contributed to its strong position in the domestic market and helped foster trust among local partners and customers, namely Polish municipalities (Grupa Solaris, 2023; Solaris, 2021).

**Table 4.** Market Share of Electric Bus Manufacturers by the Number of Buses in Operation in Poland at the End of 2023

| Electric Bus Manufacturer | Country of Origin | Number of BEBs | Share |
|---|---|---|---|
| Solaris | Spain / Poland | 648 | 60.4% |
| MAN | Germany | 77 | 7.2% |
| Ursus | Poland | 68 | 6.3% |
| Yutong | China | 58 | 5.4% |
| Volvo | Sweden | 40 | 3.7% |
| Mercedes-Benz | Germany | 38 | 3.5% |
| Autosan | Poland | 16 | 1.5% |
| Mercedes-Benz/ Automet | Germany / Poland | 12 | 1.1% |
| Mercus | Poland | 9 | 0.8% |
| Karsan | Turkey | 7 | 0.7% |
| Others | – | 100 | 9.3% |

Source: (Pire, 2024)

In a pattern similar to the European urban bus market, new manufacturers have entered the Polish market alongside with the recent electrification of bus fleets, actively participating in open tenders. Notably, most of these new entrants originate from outside Europe. Current data indicates that the Polish electric bus market exhibits a lower level of penetration by Asian manufacturers, particularly Chinese, compared to the broader European market. Meanwhile, German bus manufacturers hold a significant share of the Polish market.

## 3. The Impact of Bus Transport Electrification on the European Urban Bus Market

How extensive the changes to the European urban bus market have been due to the shift in power sources is well illustrated by the data presented in Table 5. This table compares the market shares of individual bus manufacturers in the overall urban bus market (above 8 tonnes GVW) against their shares in the electric bus market. From the standpoint of this article, the difference between these two values is particularly significant. A negative value indicates that a given manufacturer holds a larger share of the total urban bus market than of the electric bus segment. Such a result should be interpreted as a sign of lower competitiveness in zero-emission vehicles compared to the company's competitiveness in the conventional segment. Taking into account both the current and the projected increase in the share of zero-emission buses in the urban bus market, it can be concluded that, in the medium- and long-term perspective, manufacturers such as Mercedes, MAN, Scania, and Iveco will need to take effective steps to boost the competitiveness of their electric vehicle offerings in order to maintain their current market shares. Simply preserving these companies' positions in the conventional vehicle segment, without simultaneous growth in the zero-emission vehicle segment, would lead to a decline in their overall share of the urban bus market, given the drop in sales of conventional vehicles. The importance of enhancing competitiveness in the electric bus segment among the established leaders in the urban bus market is underscored by the fact that efforts are underway to ensure that, starting from 2030, 100% of newly registered urban buses will be zero-emission (Sustainable Bus, 2024a). Moreover, as shown in Figure 1, there are already countries that invest exclusively in zero-emission buses, primarily electric.

Changes in the structure of the urban bus market resulting from electrification can also be observed by analyzing the Herfindahl-Hirschman Index (HHI) for the overall urban bus market, which stands at about 1,248 points. This indicates that the electric bus segment is less concentrated than the market for urban buses as a whole. Once again, it highlights the fact that the conventional bus segment was dominated by a smaller number of manufacturers, suggesting potentially lower competition intensity compared to the electric bus segment. Furthermore, data presented in Table 5 shows that while the four largest European manufacturers collectively hold a 63.7% share of the overall urban bus market, their combined share in the electric bus market is significantly lower, at 45.4%. All of these considerations lead to the conclusion that the electrification of urban buses will force European manufacturers to intensify their investments in research and development of zero-emission technologies, optimize production costs, and adjust their business strategies in response to growing competition from manufacturers based outside Europe, primarily those from China.

**Table 5.** Market Shares of Individual Manufacturers in the Urban Bus Market and the Electric Bus Segment

| Manufacturer | Share in the Overall Urban Bus Market (above 8T GVW) [%] | Share in the Battery-Electric Urban Bus Market [%] | Difference [pp] |
|---|---|---|---|
| Mercedes | 23.7 | 8.8 | -14.9 |
| MAN | 21.2 | 15.4 | -5.8 |
| Solaris | 9.7 | 14.2 | 4.5 |
| Iveco | 9.1 | 7.0 | -2.1 |
| Scania | 5.4 | 0.4 | -5.4 |
| Volvo | 3.2 | 4.8 | 1.6 |
| BYD | 2.7 | 7.0 | 4.3 |

| | | | |
|---|---|---|---|
| Yutong | 2.0 | 6.6 | 4.6 |
| Irizar | 1.7 | 4.0 | 2.3 |
| Isuzu | 1.6 | 0.8 | -0.8 |
| VDL | 1.3 | 2.1 | 0.8 |
| Alexander Dennis | 1.0 | - | -1 |
| Van Hool | 0.6 | 0.9 | 0.3 |
| Otokar | 0.6 | - | -0.6 |
| Temsa | 0.5 | - | -0.5 |
| Zhontong | - | 4.9 | 4.9 |
| Zanson/Granton | - | 4.6 | 4.6 |
| Ebusco | - | 3.8 | 3.8 |
| Karsan | - | 3.7 | 3.7 |
| Golden Dragon | - | 2.7 | 2.7 |
| Caetano | - | 1.6 | 1.6 |
| SOR | - | 0.9 | 0.9 |
| Mellor | - | 0.9 | 0.9 |
| Rampini | - | 0.9 | 0.9 |
| Others | 15.6 | 4.5 | -11.1 |

Source: (Iriarte, 2024; Przybylski, 2024)

Scope: EU-27 (excluding the United Kingdom and Ireland) + Iceland, Norway, and Switzerland

The scale of the ongoing changes in the entire automotive market is clearly illustrated by research conducted among representatives of companies within the automotive sector, including car manufacturers and suppliers of automotive parts and components. The findings indicate that in 9 out of 11 countries analyzed, automotive industry representatives predict that by 2035, the leader in electric vehicle sales in the European Union will be a Chinese automotive brand (Exact x Forestall, 2024). Moreover, an analysis of available data shows a noticeable decline in electric bus sales in the Chinese market. This trend is depicted in Figure 2, which reveals that current electric bus sales in China are about three times lower compared to the peak period of 2016–2018. The primary reason for this drop is that many Chinese cities have already achieved 100% (or nearly 100%) electric bus penetration in their urban fleets, leading to a highly saturated market and reduced domestic demand (Hou et al., 2023; Jiang et al., 2022). As a result, and given the significant production capacity in the electric bus segment, it can be expected that Chinese manufacturers will focus in the coming years on finding new markets outside their home country. They will thus seek to further increase exports of both complete vehicles and their components. In this context, the European market, due to its size and growth potential, appears to be one of the top priorities for expansion by Chinese electric buses manufacturers.

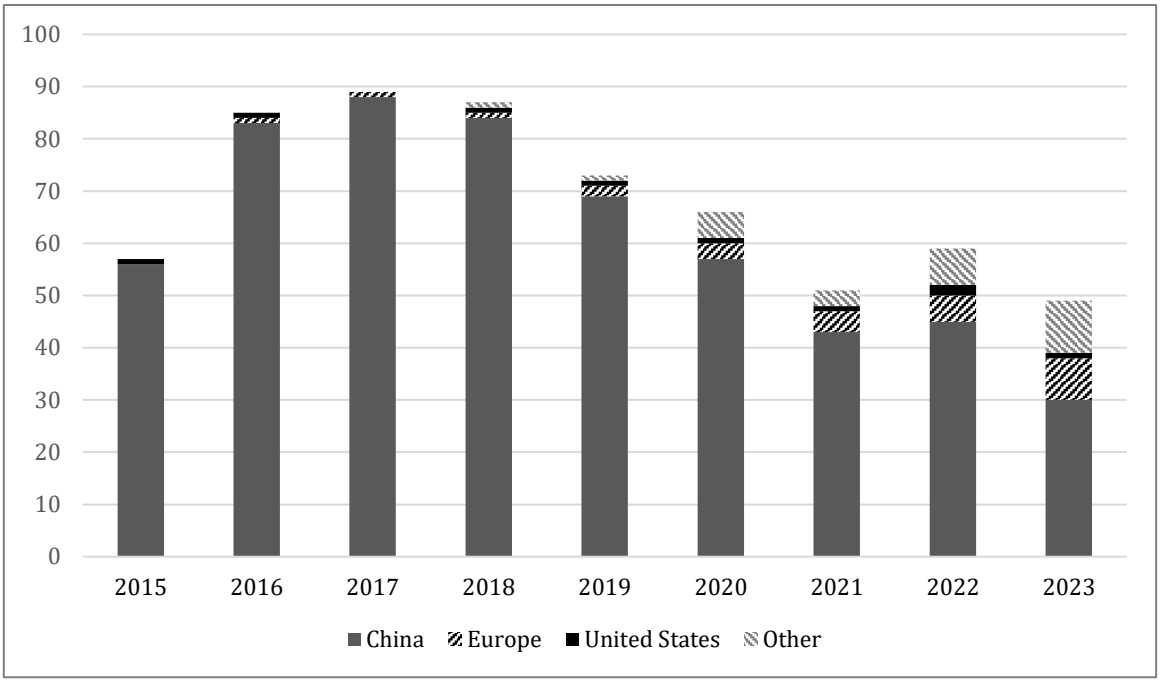


**Figure 2.** Electric Bus Sales in Selected Markets, 2015–2023 (in thousands of units)

Source: (Gül et al., 2024)

## Conclusions and Discussion

Fleet investments are crucial both from the perspective of passengers who expect high-quality public transport services and from the perspective of local governments seeking to reduce the negative impact of meeting transport needs on residents' quality of life (Jagiełło, 2017; Wolański et al., 2018). As indicated in this article's introduction, there are many reasons why urban buses are especially susceptible and predisposed to electrification. Consequently, among all segments of road vehicles, urban buses have seen the fastest and most significant rise in their share of total operating fleets. The transition from conventional to zero-emission vehicles has opened new market opportunities for bus manufacturers. Changing urban bus propulsion technology has diminished the importance of previously significant technological advantages in conventional powertrains and given rise to new areas of competition. As a result, competition among electric bus manufacturers now appears particularly intense in terms of traction battery reliability, capacity, and durability, reducing charging times, and minimizing the impact of battery weight and size on passenger space and vehicle capacity.

Given the scale and pace of the transition from conventional to zero-emission buses, it is reasonable to ask whether some of the costs incurred by European bus manufacturers should be considered sunk costs. Although certain solutions, such as technologies for structural safety, vehicle ergonomics, passenger comfort, or selected components, can be transferred from diesel-powered to electric buses, many conventional powertrain-related technologies, despite the significant investments made in their development, will have no further application in the medium- to long-term.

This study, which aims to assess the impact of the ongoing electrification of bus transport on the European city bus market, concludes that the declining concentration in the electric bus sector is intensifying competition among manufacturers. Price competition from Chinese bus producers will force European companies to further optimize production costs, enhance the efficiency of manufacturing and logistics processes, intensify their research and development efforts, and seek competitive advantages in areas such as innovative technologies, vehicle

quality, and compliance with EU regulations and local public transport operators' preferences. From the viewpoint of electric bus buyers and users, this heightened competition should lead to lower purchase prices, improved vehicle quality, and greater availability of advanced technological solutions.

On the other hand, if European electric bus manufacturers cannot effectively compete with their Chinese counterparts, one can expect a surge in imports of Chinese-made buses or the assembly of buses from Chinese components in European factories. Over the long term, this could result in greater dependence of the European market on imported vehicles, posing risks such as the weakening of domestic industry, job losses, and reduced investment in local technology development. Consequently, it might also influence trade negotiations and lead to the adoption of protectionist measures such as tariffs or regulations restricting the influx of non-European entities and vehicles.

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# WPŁYW ELEKTRYFIKACJI TRANSPORTU PUBLICZNEGO NA EUROPEJSKI RYNEK AUTOBUSÓW MIEJSKICH, ZE SZCZEGÓLNYM UWZGLĘDNIENIEM POLSKI

**Cel**. Miasta w całej Europie intensyfikują działania na rzecz realizacji celów zrównoważonego rozwoju, koncentrując się w szczególności na redukcji kosztów zewnętrznych generowanych przez sektor transportu. Głównym celem niniejszego artykułu jest ocena wpływu trwającego procesu elektryfikacji flot autobusowych w europejskich miastach na strukturę europejskiego rynku autobusów miejskich. Szczególna uwaga została poświęcona polskiemu rynkowi autobusów miejskich, który odgrywa istotną rolę zarówno po stronie podaży, jak i popytu na rynku europejskim.

**Metoda.** Analiza opiera się na danych wtórnych z lat 2020–2023, pochodzących z raportów branżowych oraz publikacji instytucji monitorujących rynek. W badaniu zastosowano wskaźnik Herfindahla-Hirschmana (HHI) oraz C4 index, mierzące poziom koncentracji rynku i dominację czołowych producentów.

**Wyniki.** Przedstawiona w niniejszym artykule analiza prowadzi do wniosków, iż europejscy producenci utrzymują silną pozycję w segmencie autobusów konwencjonalnych, co przekłada się na ich dominację w rynku ogółem. W segmencie autobusów elektrycznych rośnie jednak udział przedsiębiorstw spoza UE, zwłaszcza chińskich. Obecne trendy związane z elektryfikacją flot autobusowych w europejskich miastach mogą prowadzić do dalszego wzrostu ich znaczenia kosztem producentów z państw członkowskich UE.

**Słowa kluczowe:** autobusy elektryczne, rynek autobusów miejskich, HHI

**Klasyfikacja JEL**: L92, Q42, R48.

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