

● Kaohsiung



Kaohsiung

Key information

Current bus fleet	xxx
Current type of fleet	xxx
No. of stations/ stops/ routes	xxx
Annual ridership	55.48 million passengers (2019)
Fare system	xxx
Opportunities	Electrification of entire bus fleet by 2030

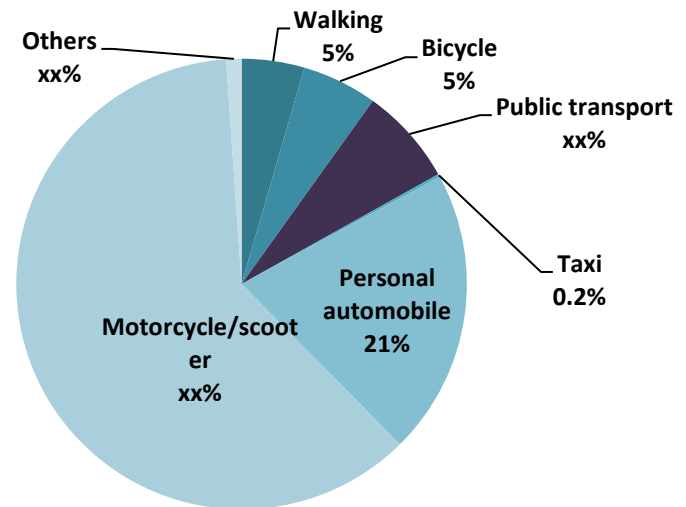
Key players

- Kaohsiung City Government's Bureau of Transportation is the main transit agency responsible for overseeing bus operations.
- Operations are outsourced to private players. Operators include xxx
- Kaohsiung City Government and Pingtung County Government in collaboration with South Taiwan Bus, Kaohsiung Bus and Pingtung Passenger Transport (operator) launched the electric buses in the city.

City background

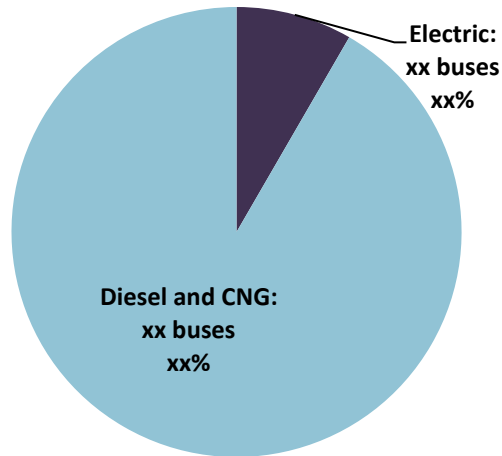
Kaohsiung is the largest city in southern Taiwan and the third-most populous city in the country. Kaohsiung has a land area of approximately 3,000 sq km. It accommodates a population of over 2.77 million people; 2 million of them live in the metropolitan area. The city is a hub for tourism, logistics, steel and ship-building industries. The city ranks at 126 in the Global Urban Competitiveness Report (2019-2020).

Modal share (2017)



Current bus rolling stock and infrastructure

Type-wise share of bus fleet (2019)*



Source: Global Mass Transit Research

Electric charging infrastructure

The city deploys fast charging technology, which enables buses to be charged in **15 minutes**.

Weihong is one of the fast charge battery suppliers in Kaohsiung.

Increase in bus fleet

Year	MRT shuttle bus	Kaohsiung City Bus
2014	xxx	893
2015	318	xxx
2016	xxx	929
2017	315	xxx
2018	xxx	1,014
2019	404	xxx

Source: Kaohsiung City Government's Bureau of Transportation

Kaohsiung City Transportation Bureau commenced trials on its first fleet of articulated, low-floor electric buses supplied by Taiwan-based Leon Energy.

Key bus suppliers

xxx

xxx

xxx

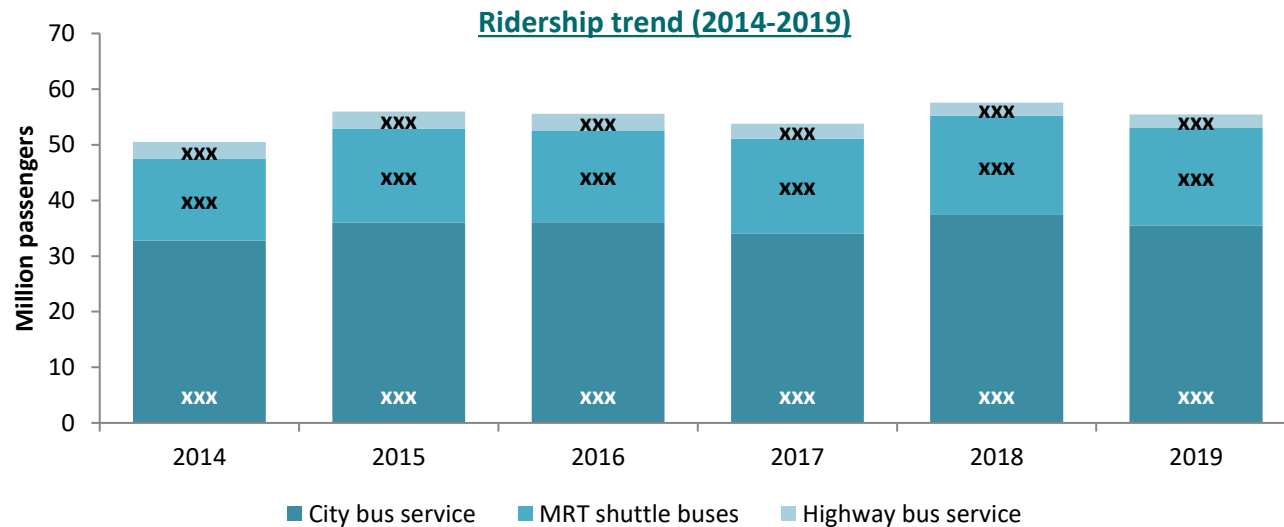
xxx

xxx

Ridership and fare system

Ridership

Between 2014 and 2019, the ridership on the bus network has expanded at a compound annual growth rate (CAGR) of xx%. The ridership on city bus routes and MRT shuttle services have increased at a CAGR of xx% and xx%, respectively, whereas, ridership on highway routes has declined at a CAGR of xxx%. Increase in ridership can be attributed to expansion of fleet and increase in the number of routes.



Source: Kaohsiung City Government's Bureau of Transportation

Fare media and technology

xxx

Autonomous bus

Autonomous bus trials

In October xxx, the first autonomous buses were unveiled, and in November xxx, trials commenced on autonomous bus in the city.

Parameters		Details
Operator	xxx	
Local partner	xxx	
Supplier	xxx	
Model	xxx	
Trial period	xxx	
Route length and route	xxx	
No of stops	xxx	
Capacity	xxx	
Speed	xxx	
End-to-end journey time	xxx	
Features	xxx	

The buses were used in closed test fields only. The data and technology could not be saved after the project ended. No further update about deployments.

Policies supporting bus procurement and modernisation (1/3)

National plans and policies for bus procurement

Control measures on diesel vehicles employed in Taiwan

This strategy seeks to control air pollution through four measures:

- Through inspection and examination of new vehicles
- By controlling vehicles in use by way of judging smoke emission of vehicles by visual determination by trained and certified environmental examiners, through instrumental examination and measurement of smoke emission, and tip-offs by public about vehicles that emit excessive smoke.
- By examination of diesel fuel (amounts of sulfur contained)
- Through the promotion of low-pollution vehicle types like **CNG**, **electric**, and **hybrid** buses.

Executive policy



Source: <https://www.khepa.tw/car/eng/main-2.htm>

Policies supporting bus procurement and modernisation (2/3)

National plans and policies for bus procurement

National policy for electrification of bus fleet

Mission

xxx

Investment

xxx

Funding and
finance

xxx

Subsidies

xxx

Opportunities
for private
players

xxx

Policies supporting bus procurement and modernisation (3/3)

City or plans and policies for bus procurement

xxx

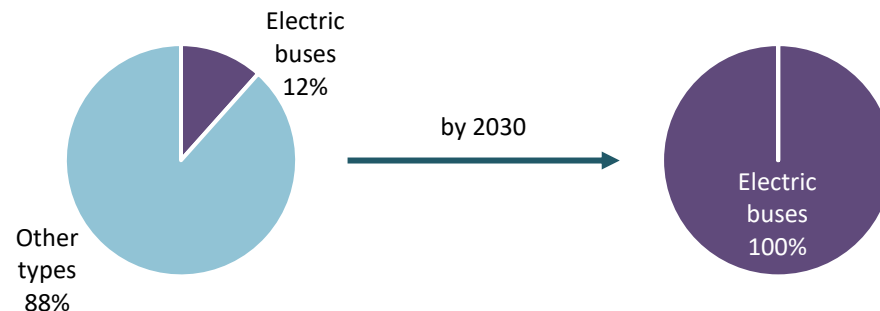
Other plans include **analyzing passenger status before and after people's use of electric buses** based on the monthly transportation data reported by the industry, **adjusting the bus schedule** in a timely manner, and **coordinating with the public transportation connections** such as Taiwan Railways and high-speed rails to effectively use transportation resources to avoid waste.

xx

Kaohsiung City Transportation Bureau will cooperate with the policy goal of the Ministry of Transport to complete the electrification of the bus fleet by 2030 from the current level of 11.6%

The Transportation Bureau encourages and actively assists the passenger transport industry to obtain **subsidies from the Ministry of Transportation, the Ministry of Economic Affairs, and other relevant central units** to purchase electric buses and to combine community patrol buses with the integration of main and secondary trunk lines to increase the coverage of the bus road network. Electronic tickets support preferential fares and encrypted schedules on the chessboard trunk network, reduces the impact of public bus transfers, and cultivates the habit of public transfers.

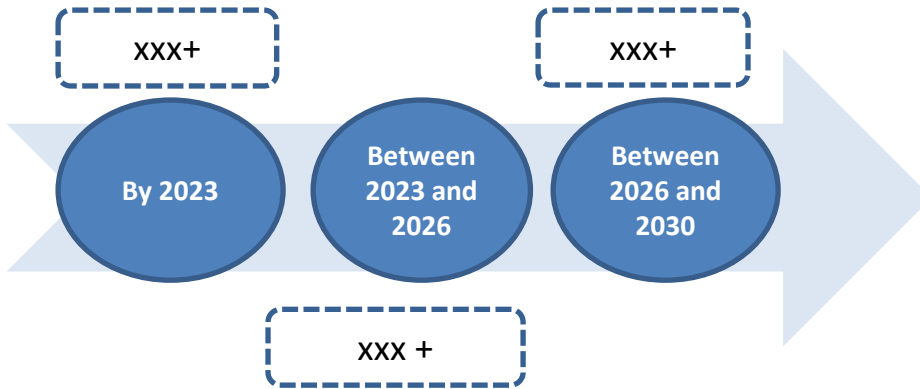
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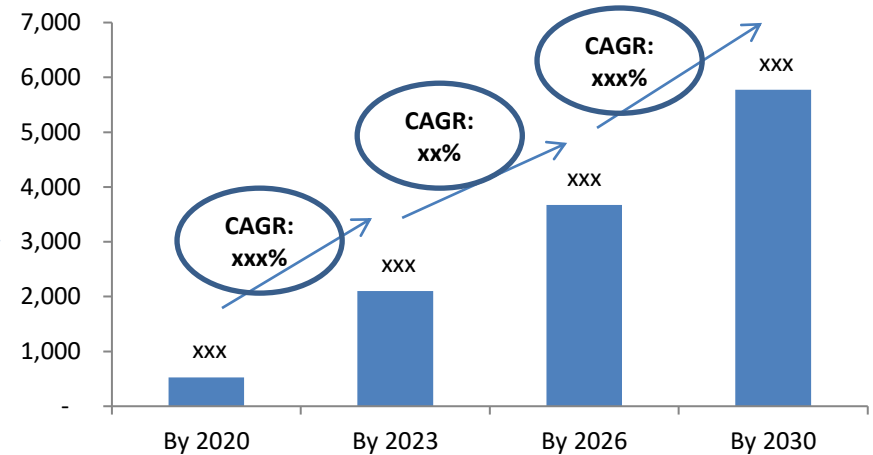
Upcoming plans and procurements

With an annual replacement rate of xxx buses, the city aims to replace its existing fleet of fuel buses with electric buses by xxx.

Timeline of electric buses to be procured



Investment projections for the procurement of electric bus fleet (TWD million)



Cost advantages and disadvantages of electric buses in the city

Cost advantages of adoption of electric buses

- Each electric bus costs almost TWDxxx million less than a diesel bus and its equivalent fuel costs are also TWDxxx lower

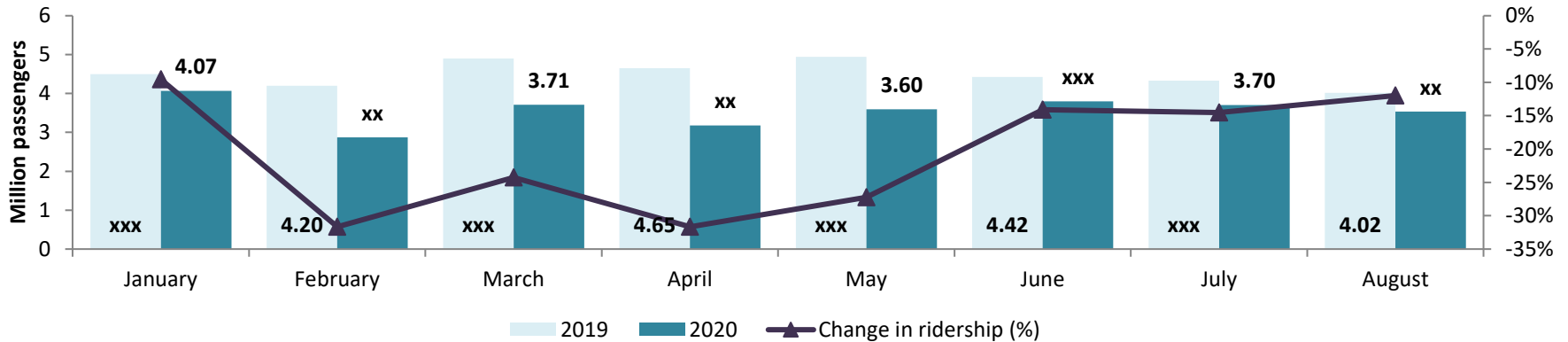
Cost disadvantages of adoption of electric buses

- Each electric buses cost TWDxxx per kilometer more than a diesel bus

Impact of COVID-19 pandemic

Between January and August 2020, the overall bus in the city has declined at a CAGR of xxx%. Maximum decline has been witnessed in city bus services (xxx%) followed by MRT shuttle service and highway bus service (around xx% each). Compared to the corresponding period in 2019, the overall bus ridership has contracted by .around xx%.

Impact on ridership



Source: Kaohsiung City Government's Bureau of Transportation

Network reorganisation

In order to improve the efficiency of bus operations in city, the in August 2020, the Transportation Bureau launched the 'Efficiency Improvement Plan'. As a part of the plan, the agency decided to analyse the data that it gathered from xxx.

The COVID-19 pandemic has impacted the efficiency of operations. xxx

Recent developments and key contacts

Recent developments

Month and Year	Category	Development
August 2020	xxx	The Kaohsiung City Transportation Bureau launched the "Bus Operation Efficiency Improvement Plan" to improve efficiency and optimize operations. Under the efficiency improvement plan, a review was conducted and buses carrying people were selected. Higher passenger carrying buses were prioritized for review and improvement and trunk buses or other areas with high potential demand were earmarked to receive greater allocation of resources.
August 2020	Other	xxx
March 2020	xxx	Kaohsiung City Airport Passenger Transport introduced the use of LINE Pay Money travel code on buses, allowing the payment with cash, e-ticket (Unicard/Young Card/iCash/HappyGo), and further with smart phones. Mobile payment can be used on the bus, the MRT, light rail, and ferry. Passengers will use the LINE Pay Money bus code to swipe the QR CODE when entering and exiting MRT stations and buses.
December 2019	New routes	xxx

Key contacts

Transportation Bureau of Kaohsiung City Government

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