

# 立法會 *Legislative Council*

LC Paper No. CB(1)705/15-16(06)

Ref.: CB1/PL/EA

## **Panel on Environmental Affairs**

**Meeting on 30 March 2016**

### **Updated background brief on trial of hybrid buses by franchised bus companies prepared by the Legislative Council Secretariat**

#### **Purpose**

This paper provides updated background information on the trial of hybrid buses by franchised bus companies. It also gives a brief account of the major views and concerns expressed by Members when related issues were discussed by the relevant committees of the Legislative Council in the 2010-2011 to 2015-2016 legislative sessions.

#### **Background**

##### Improving roadside air quality

2. To reduce air pollutants from motor vehicles including franchised buses, the Administration has been pursuing a combination of measures including encouraging franchised bus companies to deploy more environmental-friendly buses (e.g. hybrid buses) to serve busy corridors such as those in Causeway Bay, Central and Mong Kok<sup>1</sup>, with the ultimate policy objective to have zero emission buses running across the territory. To test the operational efficiency and performance of hybrid buses in Hong Kong conditions and to collect operational data, the Chief Executive announced in the 2010-2011 Policy Address a proposal to fund the full cost of procuring six hybrid buses for trial by three franchised bus

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<sup>1</sup> According to the Administration, franchised buses can account for up to 40% of the traffic at these busy corridors, and are one of the major causes of roadside air pollution.

companies along busy corridors.

### Environmental benefits of hybrid buses

3. Unlike a conventional diesel bus, the operation of a hybrid bus is aided by a motor (via a battery pack) on top of a diesel engine, which is usually smaller than that of a conventional bus. The battery pack is charged during the operation of the bus. Additional charging can be made through brake regeneration (i.e. capturing the braking power for charging the batteries). Therefore, hybrid buses have better fuel economy and emission performance than conventional diesel buses. According to a manufacturer of hybrid buses, compared with conventional diesel buses, the estimated emission reductions achieved by the hybrid buses are as follows –

- (a) 20% nitrogen oxides and nitrogen dioxide;
- (b) 40% particulates; and
- (c) 30% carbon dioxide (fuel consumption would also be reduced accordingly)<sup>2</sup>.

### Funding for trial of hybrid buses

4. The Finance Committee ("FC") approved an allocation of \$33 million in April 2011 for funding the full cost of procuring six hybrid buses for trial by three franchised bus companies<sup>3</sup> in Hong Kong<sup>4</sup>. The bus companies will be responsible for the recurrent costs arising from the operation of these buses. The

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<sup>2</sup> The estimated emission reductions mentioned in paragraph 3(a) to (c) are provided by the Administration in its written reply (Reply Serial No. ENB297) to a question raised by a Member for examination of Estimates of Expenditure 2014-2015.

<sup>3</sup> Amongst the franchised bus companies in Hong Kong, only The Kowloon Motor Bus Company (1933) Limited ("KMB"), Citybus Limited ("Citybus") and New World First Bus Services Limited ("NWFB") operate routes that serve the busy corridors in Causeway Bay, Central and Mong Kok. As the sizes of KMB and Citybus/NWFB bus fleets running in these corridors are roughly the same, the Administration allocates three hybrid buses each to KMB and Citybus/NWFB for trial.

<sup>4</sup> According to the Administration, apart from the funding of \$33 million for procuring the hybrid buses, the Environmental Protection Department ("EPD") has to deploy additional staff resources to oversee the trial, evaluate the environmental performance of the hybrid buses and the trial results, and work with the participating franchised bus companies, bus manufacturers and relevant government departments, to take forward the trial. The additional manpower resources will be reflected in the Estimates of Expenditures of the relevant year. The six double-deck hybrid buses subsequently procured are all from the United Kingdom.

six hybrid buses have commenced trial runs on six routes since late 2014, all running through the low emission zones ("LEZs")<sup>5</sup>, i.e. the busy corridors in Causeway Bay, Central and Mong Kok.

5. The trial of hybrid buses will last for two years to enable a comprehensive assessment of their operational efficiency and performance, in particular the durability and reliability of the battery under local conditions of hilly terrains and hot and humid summers. If the trial is successful, the Government will encourage the franchised bus companies to use hybrid buses on a wider scale.

### **Major views and concerns expressed by Members**

6. The Panel on Environmental Affairs ("the Panel") discussed on 24 January 2011 the proposal to fund the full cost of procuring six hybrid buses for trial by the franchised bus companies. Issues relating to the trial were raised when the funding proposal was considered by FC at its meeting on 15 April 2011, and during examination of the Estimates of Expenditures in recent years. The major views and concerns raised by Members during these discussions are summarized in the ensuing paragraphs.

#### Testing and evaluation of the performance of the hybrid buses

7. Members stressed the need to conduct stringent stress test for the hybrid buses under trial, in particular to ascertain whether the batteries would lead to additional wear and tear and accelerate vehicle aging, thereby requiring extra maintenance.

8. The Administration advised that the participating franchised bus companies would be required to operate the hybrid buses in busy corridor roads under normal operating situation. The choice of bus service routes would be a mix of different road environments including busy corridors in Causeway Bay, Central and Mong Kok, highways and uphill/downhill roads. As batteries were the critical parts of hybrid buses, the Administration would ask the bus manufacturer to provide data on battery durability and to provide warranty of batteries for a specified period of time under the procurement contract.

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<sup>5</sup> To improve roadside air quality and protect public health, the 2010 Policy Address announced the plan of setting up LEZs in Causeway Bay, Central and Mong Kok with the target of having only low emission franchised buses travelling in these zones by 2015. The three LEZs are located at Yee Wo Street in Causeway Bay; the junction of Des Voeux Road Central/Pedder Street in Central; and the junction of Nathan Road/Lai Chi Kok Road in Mong Kok respectively.

9. Members enquired about the parameters and criteria for evaluation of the performance of the hybrid buses. They called on the Administration to lay down clear benchmarks for evaluation and consideration of a wider use of hybrid buses in the future.

10. The Administration advised that it had agreed with the participating franchised bus companies on the parameters for assessment which included fuel economy, operational efficiency, durability and reliability of the batteries, maintenance requirements and, above all, emission performance. The fuel economy and emission performance of the hybrid buses would be assessed against the data provided by the bus manufacturer, while the operational efficiency in terms of maintenance requirements and turn-out rate, etc. would be compared with that of conventional buses.

11. Some Members suggested that environmental experts from universities and representatives from environmental groups should be invited to join the task force set up by the Government to monitor the trial. In addition, independent organizations, such as the Heavy Vehicle Emissions Testing and Research Centre of the Vocational Training Council, might be invited to assist in the collection and analysis of operational data.

12. The Administration explained that as the task force would mainly focus on the analysis of operational data and monitoring of day-to-day operations of hybrid buses, its membership included representatives from the participating franchised bus companies and relevant government departments<sup>6</sup>. The Administration indicated that it would review the composition of the task force when appropriate.

#### Ownership, repair and maintenance of hybrid buses under trial

13. On the ownership of the six hybrid buses and the arrangements on maintenance and repair, the Administration advised that the hybrid buses would continue to be deployed by the respective franchised bus companies until the end of their economical service life or until they had reached the age of 18 years. According to the signed agreement between the Government and the franchised bus companies, the latter was responsible for maintenance and repair of their bus fleet and such arrangement was applicable to the hybrid buses under trial. The cost of technical training for mechanics would also be borne by the participating franchised bus companies.

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<sup>6</sup> Including the Transport Department and EPD

### Wider use of hybrid buses

14. Members urged the Administration to proactively encourage franchised bus companies to replace in phases their aging fleet with buses of better fuel economy and emission performance. There was a suggestion that franchised bus companies participating in the trial should be required to procure a certain number of hybrid buses when replacing the existing fleet if the trial was successful. Some other Members, on the other hand, considered it premature to plan for a wider use of hybrid buses before the operational efficiency and performance of hybrid buses had been ascertained. Besides, it might not be financially viable for franchised bus companies to replace all the existing buses with hybrid buses given the higher cost of hybrid buses. It was also uncertain whether there would be sufficient hybrid models for making replacement on a wide scale.

15. The Administration advised that since 2002, provisions were included in the franchise agreements to require the bus companies, as far as reasonably practicable, to adopt the latest commercially available and proven environment-friendly technologies for acquiring new buses to reduce emissions. The Administration stressed the importance of collecting sufficient data and evaluating the performance of hybrid buses under local operation conditions before considering whether to put them to wider use. Other factors such as cost impact on the bus operators and passengers, and outcome of the trial of electric buses<sup>7</sup> would also be taken into account.

### **Council questions**

16. At the Council meetings on 14 December 2011 and 3 February 2016, Hon Jeffrey LAM and Hon CHAN Hak-kan raised questions respectively relating to emission reduction measures of franchised buses and improvement to roadside air quality. Issues covered in the questions include the progress of trial on hybrid buses and the measures to encourage the public to switch to hybrid vehicles. The questions and the Administration's replies are hyperlinked in the **Appendix**.

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<sup>7</sup> FC approved an allocation of \$180 million in July 2012 for fully subsidizing the franchised bus companies to procure 36 electric buses and related charging facilities for trial under local conditions. The trial has commenced progressively from late 2015 and will last for two years.

### **Latest development**

17. At the meeting on 30 March 2016, the Administration will brief the Panel on the interim assessment of the trial performance of hybrid buses.

### **Relevant papers**

18. A list of relevant papers is set out in the **Appendix**.

Council Business Division 1  
Legislative Council Secretariat  
18 March 2016

**Trial of hybrid buses by franchised bus companies**

**List of relevant papers**

<b>Date of meeting</b>	<b>Event</b>	<b>Paper</b>
24 January 2011	Meeting of the Panel on Environmental Affairs	<p>Administration's paper on trial of hybrid buses by franchised bus companies (LC Paper No. <a href="#">CB(1)1098/10-11(04)</a>)</p> <p>Background brief on trial of hybrid buses by franchised bus companies prepared by the Legislative Council Secretariat (LC Paper No. <a href="#">CB(1) 1098/10-11(05)</a>)</p> <p>Minutes of meeting (LC Paper No. <a href="#">CB(1)1509/10-11</a>)</p>
15 April 2011	Meeting of the Finance Committee	<p>HEAD 44 – Environmental Protection Department Subhead 700 General non-recurrent New Item "Trial of Hybrid Buses by Franchised Bus Companies (LC Paper No. <a href="#">FCR(2011-12)4</a>)</p> <p>Minutes of meeting at 5:05 pm (LC Paper No. <a href="#">FC119/10-11</a>)</p>
5 March 2012	Special meeting of Finance Committee for examination of Estimates of Expenditure 2012-2013	<p>Written questions raised by Members and Administration's replies (Reply serial numbers: <a href="#">ENB050, 056 and 100</a>)</p>
9 April 2013	Special meeting of Finance Committee for examination of Estimates of Expenditure 2013-2014	<p>Written questions raised by Members and Administration's replies (Reply serial numbers: <a href="#">ENB068, 107, 185, 189 and 265</a>)</p>

<b>Date of meeting</b>	<b>Event</b>	<b>Paper</b>
1 April 2014	Special meeting of Finance Committee for examination of Estimates of Expenditure 2014-2015	Written questions raised by Members and Administration's replies (Reply serial numbers: <a href="#">ENB217, 236, 248, 271, 297 and 301</a> )
30 March 2015	Special meeting of Finance Committee for examination of Estimates of Expenditure 2015-2016	Written questions raised by Members and Administration's replies (Reply serial numbers: <a href="#">ENB098, 156, 288 and 340</a> )

**Hyperlinks to relevant Council Questions:**

<b>Date</b>	<b>Council Question</b>
14 December 2011	<a href="#">Press release</a> on Council question (written) raised by Hon Jeffrey LAM
3 February 2016	<a href="#">Press release</a> on Council question (written) raised by Hon CHAN Hak-kan