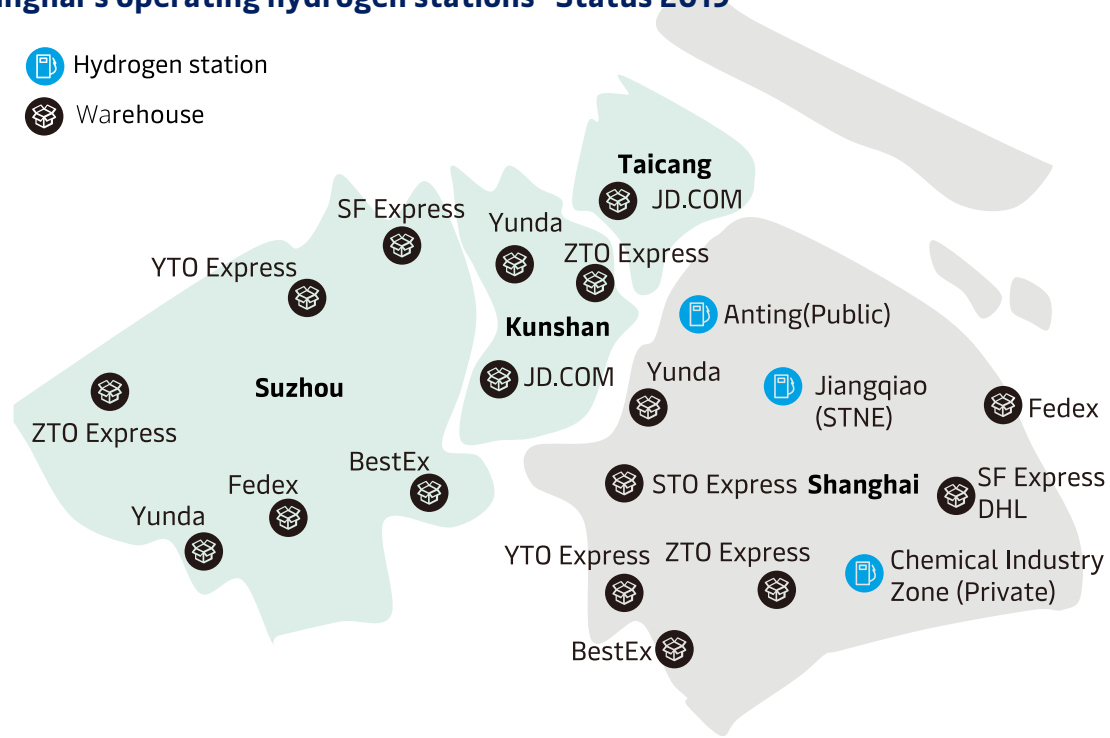
Key global developments w.r.t hydrogen fuelled private & public transport & piloting projects that are in function along with their relevant business models

Tracking Global Developments

Private Transport & Piloting

Shanghai is one of leading fuel cell application cities in China. There are currently three hydrogen stations running in Shanghai, which are in Jiading, Feng Xian and Jiangqiao respectively. Furthermore, 13 hydrogen stations are in site selection stage as Shanghai continues to expand on its hydrogen infrastructure. As a major logistical focal point for surrounding regions, many logistics companies have built a network of logistics centers and warehouses around the region. A network of hydrogen fueling stations will help move the city towards greener mobility solutions.

Exhibit: Shanghai's operating hydrogen stations- Status 2019



Public transport & piloting

Transport for London ("TfL") is the integrated transport authority responsible for the day-to-day operation of the city's public transport network including buses, the undergrounds, light railways, taxis, etc. In December 2003, TfL started its trial of the first generation of fuel cell buses in London to reduce air pollution in the city. This trial was also part of Hy Fleet: CUTE project, which brought together 31 partners from industry and government from across Europe aiming to push the development of hydrogen-based transport systems in Europe and was funded by the European Union and the UK government. After the successful trial, in 2010, as part of the Clean Hydrogen Cities project ("CHIC"), TfL purchased 5 next generation hydrogen fuel cell buses and put them into formal operation serving London citizens on the popular tourist route RV1 between Covent Garden and Tower Gateway. This is the first time a whole route has been fully operated by hydrogen powered buses in the UK. In 2013, TfL purchased three more hydrogen fuel cell buses and expanded the size of the fleet to eight buses. Then in 2015, TfL again added 2 more fuel cell buses to the fleet. At present, the ten zero emission fuel cell buses are serving London citizens on route RV1 in the city center of London. In May 2019, Transport for London ordered another 20-hydrogen fuel cell double-decker buses to expand its zero-emission bus fleet. The 20 hydrogen fuel cell buses will be put into operation in 2020 on routes 245, 7 and N7

Exhibit: Milestones of hydrogen fuel cell buses applications by TfL

2003-2017 — Trial Run

- Started a trial of the first generation of zero emission fuel cell buses in city of London
- Purchased 3 fuel cell buses run on Route RV1[209]

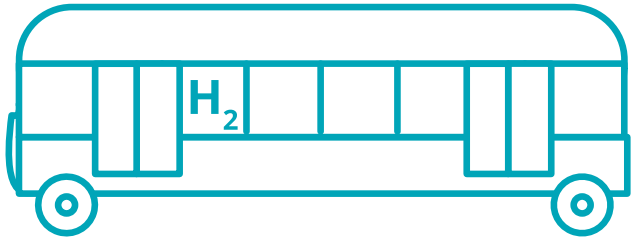
2010 — Formal operation stage

- Following the successful trial, 5 next generation hydrogen fuel cell buses were purchased and put into formal operation on route RV1[210]

2013 / 2015 / 2019 — Capacity Upgrade

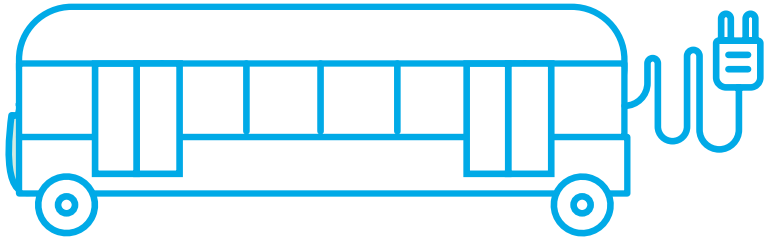
- In 2013, 3 additional hydrogen fuel cell buses joined the fleet [210]
- In December 2015, purchased 2 hydrogen fuel cell buses from Van Hool in December 2015 [211], the size of the fuel cell fleet reached 10
- Ordered another 20 fuel cell double-decker buses from Wrightbus in May 2019 [212]
- The 20 buses will be put into operation starting 2020 on routes 245, 7 and N7 [212]

Exhibit: Parameters contrast of different types of buses



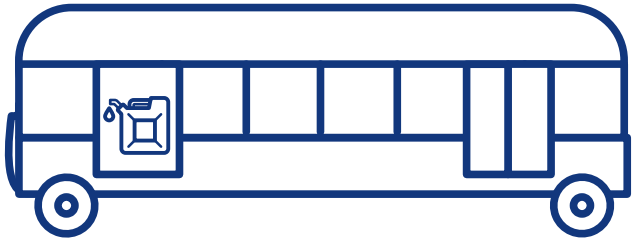
FCEV [214]

- Electric motor capacity: 200 kw (around 270 HP)
- Fuel cell system capacity: 30-100 kw
- Load capacity: 85 passengers
- Driving distance: Avg. 350 km, up to 500 km



BEV [215]

- Electric motor capacity: 200 kw (around 270 HP)
- Battery capacity: 382 kwh [216]
- Load capacity: 84 passengers
- Driving distance: ~250 km [215]



ICEV

- ICE capacity: 310 HP [217]
- Load capacity: ~120 passengers
- Driving distance: >300 km

Exhibit: Business model of London buses operation

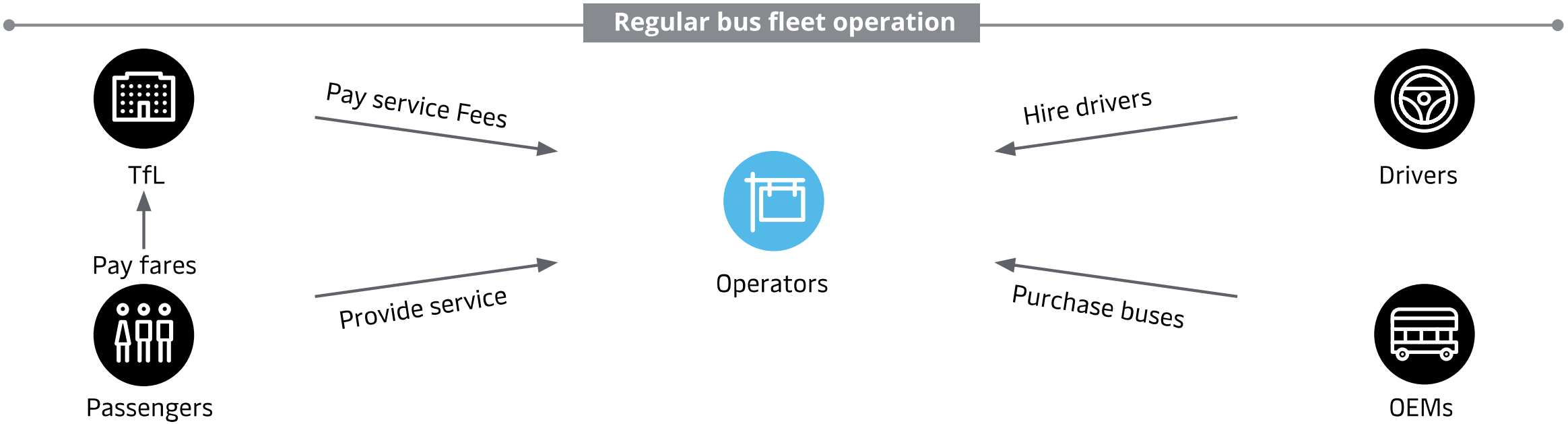
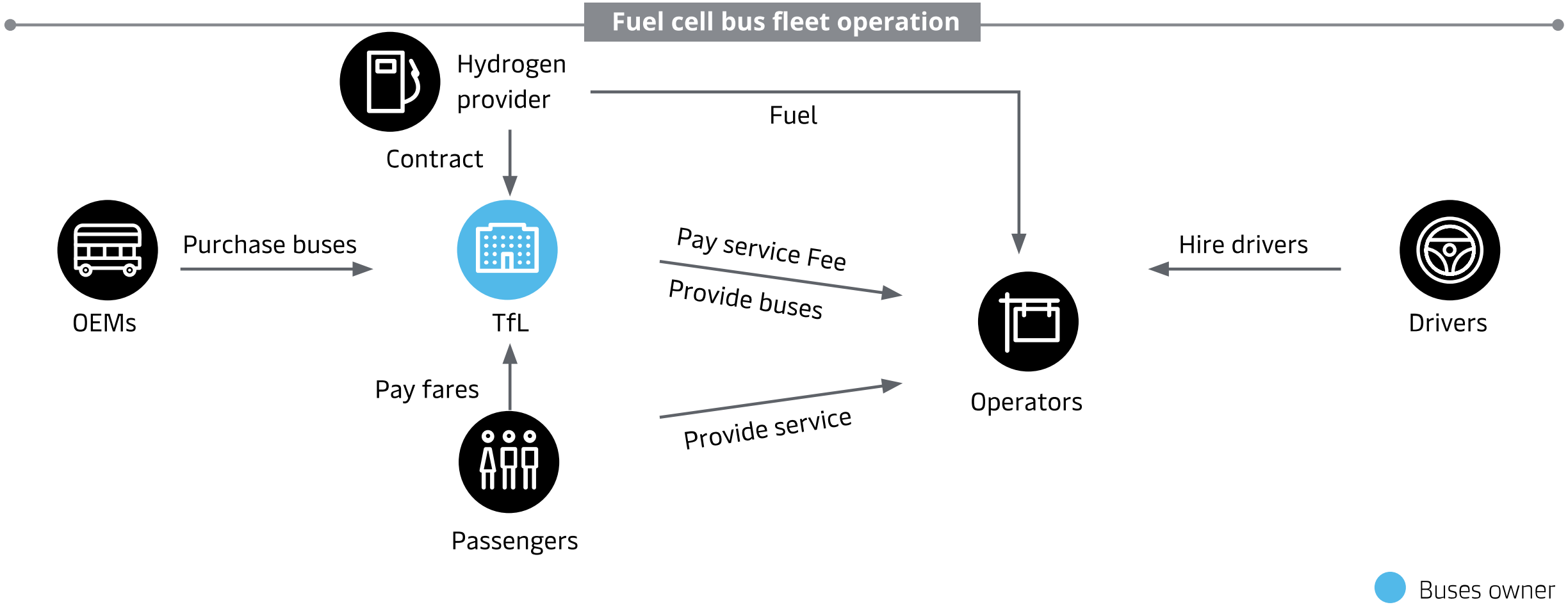


Exhibit: Business model of London buses operation (contd.)



Truth is ever to be found in the simplicity, and not in the multiplicity and confusion of things

- Sir Isaac Newton

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