## Fuel consumption

### Private car

See R script. We have to consider specific models. Most of them are not justified, because of lack of data (such as CNG, BEV, PHEV, HEV-D)

## Taxi

We assumed same fuel consumption between private car and taxi. Proof?

## Public bus

We base the public bus fuel consumption from a study by (Zhang et al., 2014) in the city of Bejiing. Justify to use Beijing for a proxy to Singapore: Population (21.5 million Beijing, 5 million in Singaproe). Density (1300 pop/km2 Beijing, 7804 pop/km2). Road conditions? Traffic?

As Singapore is significantly warmer than Beijing (Values) we assume that there is a higher use of air-conditioning in Singapore (assumed at maximum capacity). So +22.8% for ICEB-D, +9% for CNGB, +48.2% for HEB-D.

1.15 L gasoline / L Diesel

23.7 MJ/L of CNG

|  |  |  |  |
| --- | --- | --- | --- |
| Technology | Fuel | Value (L/100km) |  |
| ICEB-D | Diesel | 32.6\*1.228=40 | (Zhang et al., 2014) |
| ICEB-G | Gasoline | 40\*1.15=45.8 |  |
| HEB-D | Diesel | 24.3\*1.482=36 | (Zhang et al., 2014) |
| HEB-G | Gasoline | 36\*1.15=41.4 |  |
| CNGB | CNG | 16.1[MJ/km]\*1.09\*100/23.7[MJ/L]=74.1 | (Zhang et al., 2014) |
| EB | Electricity | 172 | Literature review laura |

ICEB-D is consistent with prior studie in Singapore, with a value of 42.3 L/100km for ICEB-D (Wei & Cheah, 2015). This is however almost half of the values of 72.1 L/100km reported by Alternative Fuels Data Center of the U.S. Department of Energy provides data on average fuel economy of different vehicle categories (U.S. Department of Energy, 2019). Why?

We assume that technology called CNG and Petrol-CNG are assumed to be CNG bus in LTA.

We assume that private bus and school bus have the same fuel consumption. Back up for this assumption?

## Motorcycle

Manufacturer fuel economy by model year motorcycle: <https://www.totalmotorcycle.com/MotorcycleFuelEconomyGuide/index?d=1>

From (Koossalapeerom et al., 2019)

|  |  |  |  |
| --- | --- | --- | --- |
| Technology | Fuel | Value | Source |
| ICEM-G | Gasoline | 2.43 (l/100km) | (Koossalapeerom et al., 2019) |
| EM | Electricity | 2.8 (kWh/100km) | (Koossalapeerom et al., 2019) |

## MRT and LRT

Same electrical consumption by veh.km: 7220 kWh/100km

We assume that all transport-related electricial consumption of EMA.gov is associated with LRT and MRT. Can we check that? Contact someone? We further assumed similar electrical consumption by MRT and LRT vehicle km travelled.

Compare electrical consumption of such systems with literature. Better to do by pkt?

# Fleet module

## Taxi

We assumed similar survival rates between Taxi and private cars. Proof? Contact someone? Lynette? How to better assume survival of taxi? Idea of lifetime?