

## Pollution Control 2020- Review effects of environmental and health replacement diesel bus with electric bus in Tehran mega city- Fatemeh Hassani- International University of Imam Khomeini (RA) in Qazvin

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### Abstract

In recent years one from important requests of people in Tehran and others mega cities in Country, Attention to air pollution issue. Fossil fuel of point Sources (such as buildings) and also Diesel fuel of mobile Sources (Bus and General transportation), there are two main Sources of air pollution. In Tehran too, according to the latest municipality report. They account for half of the airborne particles. One of the main causes of pollution in Tehran is the problem of fuel and therefore eliminating diesel engines and converting them to clean energy such as electricity has been one of the applicable strategies for air pollution control.

The purpose of this study was to investigate the health and environmental effects of replacing diesel fuel with powered electric buses in Tehran. Looking at the cost of replacing diesel bus fuel consumption and pollution costs. Result, the amount of social costs associated with carbon generation in all public buses is estimated at about 6786.72 \$ per day for a daily commute, estimated at about 2477152.8 \$ per year. The social cost of carbon footprint on all private sector buses is estimated to be about 8665.92 \$ per trip, then estimated at about 3163060.8\$ per year. On the other hand, the average daily mileage of each bus is 120 kilometers. Studies have estimated the cost of \$ 0.08 to travel 1.6 km for a bus. Therefore, it is estimated that the cost is approximately 0.05 \$ per kilometer and the health cost is 6 \$. So, the cost of a daily commute for the entire private sector bus is estimated at 4393140 \$ over a year. Conclusion, Fuel consumption per 100 kilometers of a bus in Tehran is about 46 liters. On the other hand, the direct and indirect impacts of air pollution impact on the individual, local and national economies. It has always been difficult to accurately measure these effects.

**Keywords:** diesel fuel, electric bus, air pollution, health costs, environmental costs

### Results:

1- Social cost calculations based on carbon production assuming that the fuel consumption of a bus at 100 km is about 46 liters in Iran and one liter of fuel produces about 2.2 kg of carbon, the calculations are as follows:

$$46 * 2.2 = 101.2 \text{ kg carbon} = 0.1 \text{ ton} * 36 \$ = 3.6 \$$$

According to calculations, it costs \$ 3.6 to travel 100 kilometers on a bus. On the other hand, each bus in Tehran has a daily traffic of about 120 km, and taking into account the 1571 buses of the public sector bus, this amount of travel and cost is calculated as follows:

$$1571 \text{ devices} * 120 \text{ km} = 188520 \text{ km}$$

The daily survey of the public sector is 188,520 km, and for every 100 km of the survey, about \$ 3.6 is the social cost of producing carbon, and for the total daily survey, the costs are calculated as follows:

$$(188520 * \$ 3.6) / 100 = \$ 6786/72$$

The total social cost of producing carbon on public-sector buses is estimated at \$ 6,778,727 per day, and this is estimated at \$ 247,77,152 over 365 days.

For the 2006 private sector bus, the following survey and cost are calculated as follows:

$$2006 * 120 \text{ km} = 240720 \text{ km}$$

The daily private sector survey is 240,720 km, and for every 100 km of survey, about \$ 3.6 is the social cost of producing carbon, and for the total survey, it is calculated as follows:

$$(240720 * 3/6 \$) / 100 = 8665.92 \$$$

The total social cost of producing carbon in all buses in the private sector is estimated at \$ 866,692 per day, and this is estimated at \$ 3,316,3060 during the 365s.

### 2- Health costs:

According to studies, the cost per bus ride is estimated at \$ 0.88, so it is estimated that it will cost about \$ 0.05 per 1 km. On the other hand, the amount of health costs per 100 kilometers of travel is calculated as follows:

$$100 * 0.05 = \$ 5$$

The daily walking distance of each bus in Tehran is about 120 km and the relevant cost is equal to:

$$(120 * 5) / 100 = \$ 6$$

Based on the daily survey of all buses in Tehran, the cost of health is calculated as follows:

- Total public sector buses 1571 devices:  
 $1571 \text{ devices} * 120 \text{ km} = 188520 \text{ km}$

On the other hand, the daily cost of health is \$ 6 per bus ride, which is 120 km. herefore, the daily cost of public transportation for the total daily bus travel is as follows:

$$(188520 \text{ km} * 6 \$) / 120 \text{ km} = 9426 \$$$

This is estimated at \$ 3440,490 during 365.

- All 2006 private buses:  
 $2006 * 120 \text{ km} = 240720 \text{ km}$

On the other hand, the daily cost of health is \$ 6 per bus ride, which is 120 km. Therefore, the daily cost of private buses for the total number of private buses is as follows:

$$(240720 \text{ km} * 6 \$) / 120 \text{ km} = 12036 \$$$

This is estimated at \$ 439,3140 over 365 days.

3- Calculating the emission rate of air pollutants of a bus based on emission coefficients:

The amount of fuel consumption per 100 km of a bus in Tehran is about 46 liters, and on the other hand, considering that the rate of navigation of each bus is 120 km per day, so in this distance, the amount of fuel consumption is as follows:

$$(120 * 46) / 100 = 55.2 \text{ liters of daily consumption of a bus}$$