
Case Study Report

Recent strategies of Tehran to achieve low carbon city to improve the health of citizens

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Abstract

Urbanism is a dominant phenomenon in settling of human beings. Cities are spreading rapidly because growth of economy is depended to the growth of urbanism. At a glance on the process of urban development, since the industrial revolution till now in addition to the economic growth a rapid increase in pollution in cities has been created. Industrial cities suffered a lot from pollution of industrial activities and dense urbanism. In 20th century after increasing of the destroying of natural environment and appearing of the effects of unsustainability forced the experts to rethink about the process of urbanism and industry toward the sustain development. However human being is still suffering from many kinds of pollutions and experts are continuously creating some strategies which can improve the quality of life and health in cities. Tehran is a city with nine million population and the second populated city in middle east. This city is suffering from dense population and sever pollution and traffic jam for many years. The pollution of this city is so high that in several days in year education and official activities should be closed because of sever pollution of the air.

Keywords

Low carbon city, air pollution, Tehran city, urban strategies

1. The history of Tehran

Tehran the capital of Iran is a city with about 615 Km² and 9.4 million population, it is the second populated city in the middle east.

This city has been divided to 22th districts which the largest district in Tehran is district 22 and the smallest one is district 17 (figure 1).

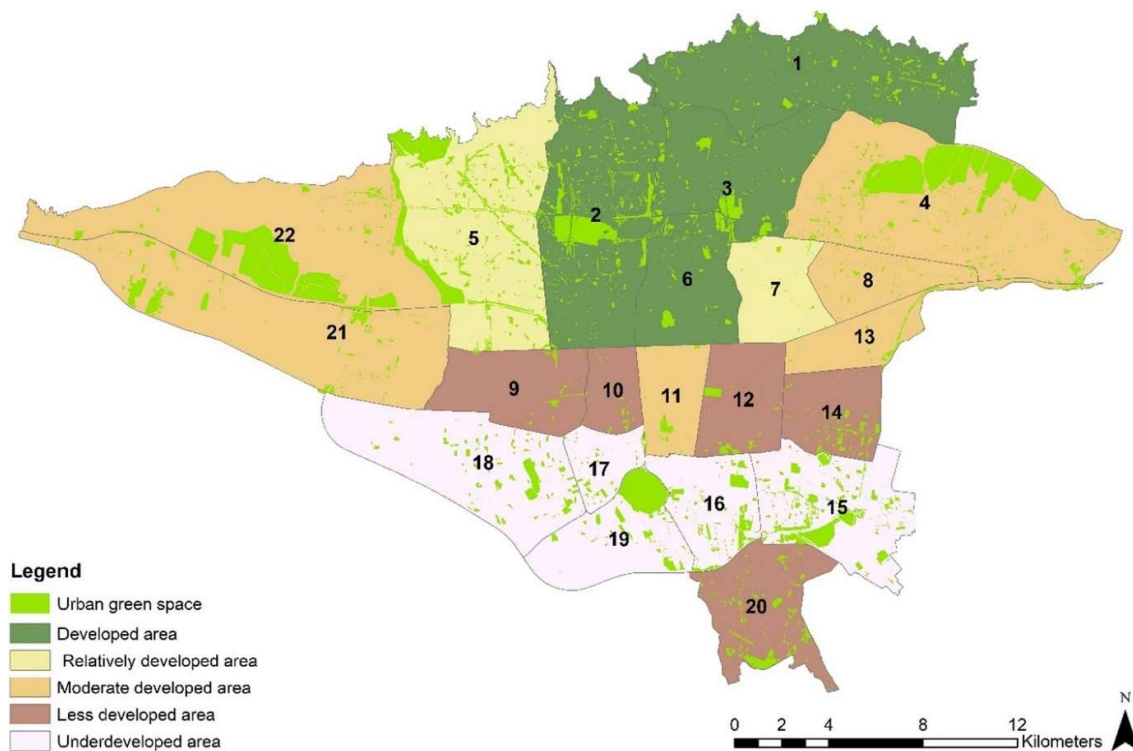


Figure 1 - 22 district of Tehran

The rate of the growth of population is annually %1.79 which is more than the average rate of the country but it should be investigated that this statistic is because of migration or birth.

The average of the residential per capita in this country is 46 persons in each km² that the average of this number in Tehran is 973 which in some areas will increase up to 10 thousand people in one km². There are 19.3 million commutes daily in city of Tehran.

The rate of producing garbage in Tehran by its citizens is four times more than the average rate of producing garbage in the world.

2 – pollution of Tehran city:

This city is suffering from the large density of population and pollution and severe traffic jam.

Rate of air pollution in Tehran is so high which every year offices and schools should be closed in high polluted days. Each year there are minimum 5 to 10 days polluted days which are dangerous for citizens, this mostly happens in winters.

With reviewing the statistics of 2019 and 2020 we can see that the average rate of pollution includes SO₂, CO, PM_{2.5} have been decreased during these years but the average rate of them in 2020 were increased. In 2020, the amount of PM_{2.5} in air was in unhealthy situation for 71 days. Also, in 2020 the rate of O₃ was in unhealthy situation for 25 days (with 3% present growth more than previous year).

Totally in 2020 the average rate of all pollutions except Co was increased 5.8% in comparison with the previous year.

In 2020 in half of the year in winter and summer there were unhealthy 61 days and schools were closed for 10 days because of air pollution. However, in 2019 schools weren't closed because of air pollution (Hossieni Milani, 2021, p 117).

Figure no.2 shows polluted days and the rate of pollution during 2021 and 2022 in Tehran.

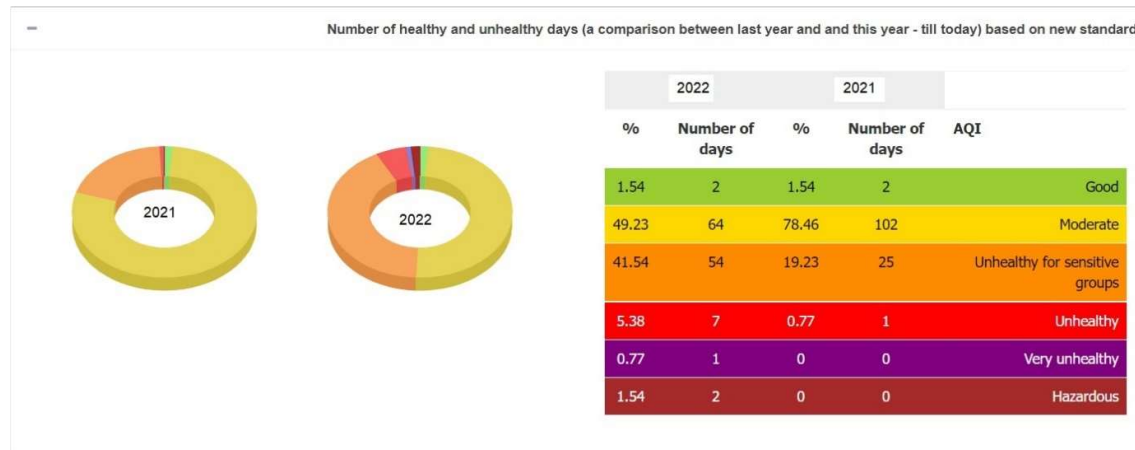


Fig no. 2 - The rate of air pollution in 2021 and 2022

2.1 strategies of municipality of Tehran for decreasing the air pollution

In spite the fact that the municipality of Tehran has some strategies to decrease the air pollution of Tehran but there is a long way to achieve a clear air in Tehran. Some of these ways include improving public transportation by Taxi and bus and especially metro. There are some affords about pedestrianization of city and making this city adaptable for walking and bicycle. Improving the fuel of vehicles, using filters in vehicles decreasing issuing of carbon and mitigating commutes by mixing land uses are some strategies which are accomplishing by the municipality of Tehran or are supposed to be done later.

3- public transportation in Tehran

The most important way of controlling the air pollution of Tehran in persuading citizens to use public transportation.

The standards of public transportation of Iran have been upgraded in 2020 and it has been presented to use in Iranian cities such as Tehran.



Figure 3- standards of public transportation

Public transportation of Tehran includes bus and taxi and metro which their features have been described briefly as follows:

3.1 Bus

In spite of the fact that 60 buses and 13 double cabin buses have been added in public transportation of Tehran but unfortunately government should support the buses and metro of municipality of Tehran as much as possible.



Figure 4 - The station of BRT of city of Tehran

The lines of BRT (bus rapid transit) have been implemented since 2007. There are 10 lines for BRT in Tehran.

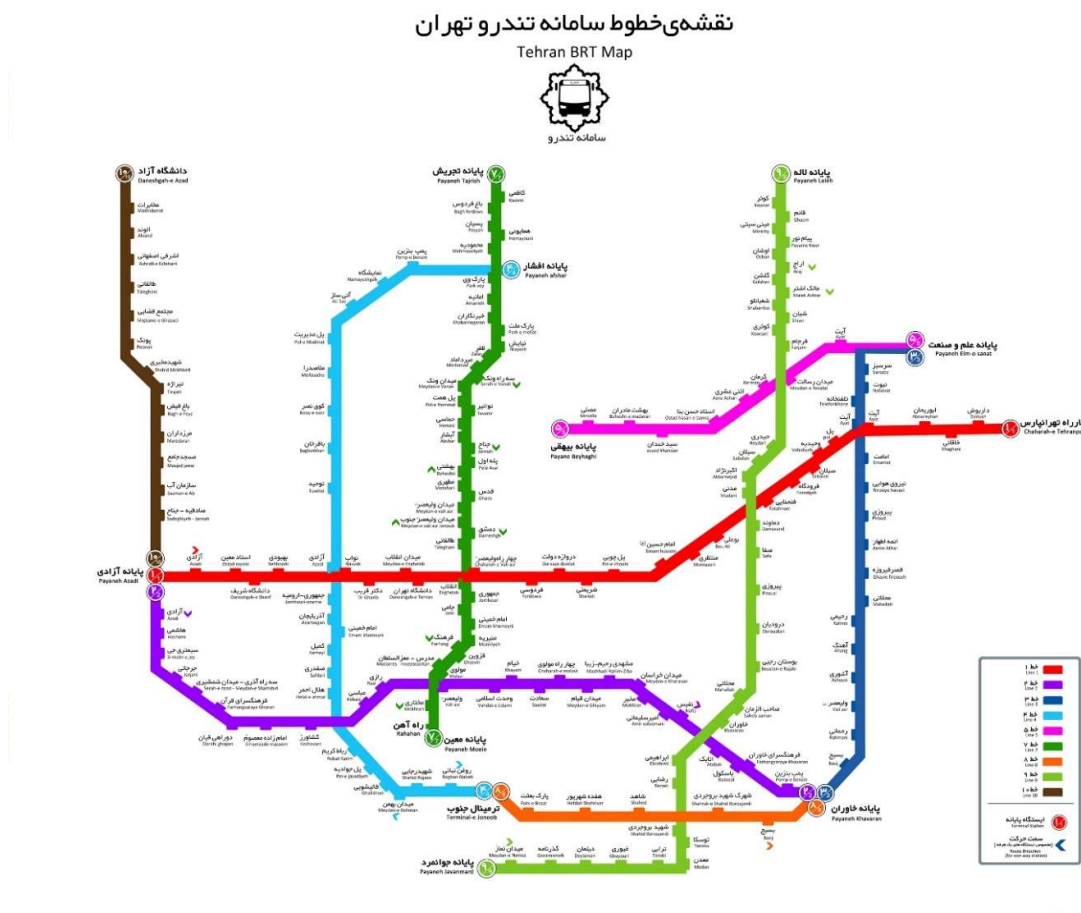


Figure 5- The lines of BRT in Tehran

3.2 Taxi

More than 2500 taxis in Tehran have been renewed and also 695 worn minibuses have been replaced with new taxis and 177 new minibuses have been used.

3.3 Metro

The length of the metro of Tehran in nearly 253 km and there are 145 stations. The speed of metro is about 120 km per hour. There are 7 active lines in Tehran.

Metro of Tehran is one of the crowded metros in middle east. More than 2.5 million people move by metro daily.

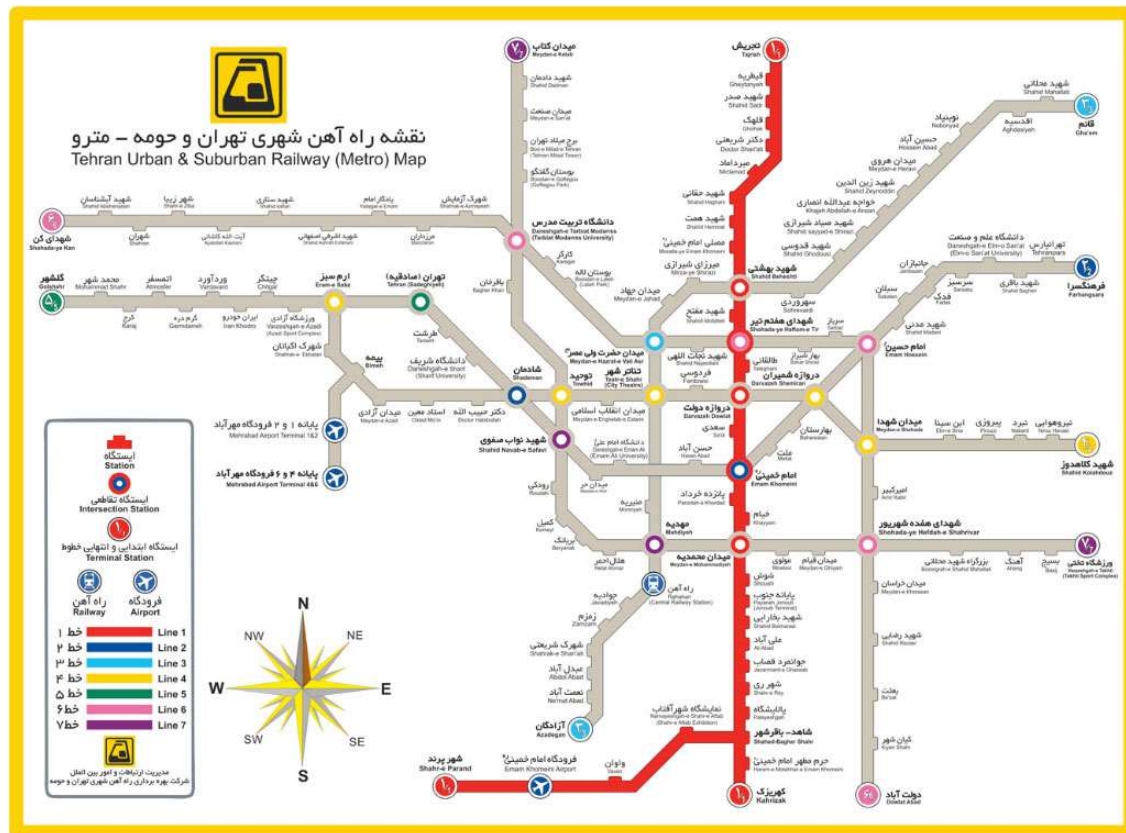


Figure 6- The map of 7 lines of metro of Tehran

4 – pedestrianization in Tehran

About the walkable streets and their features, it is necessary to issue more complete guidelines. However, some guidelines have been issued and it is necessary to give enough attention to perform them. The main point is that when we don't create walkable speed and attractive path for bicycles, we cannot be assured about making pedestrianization of city.

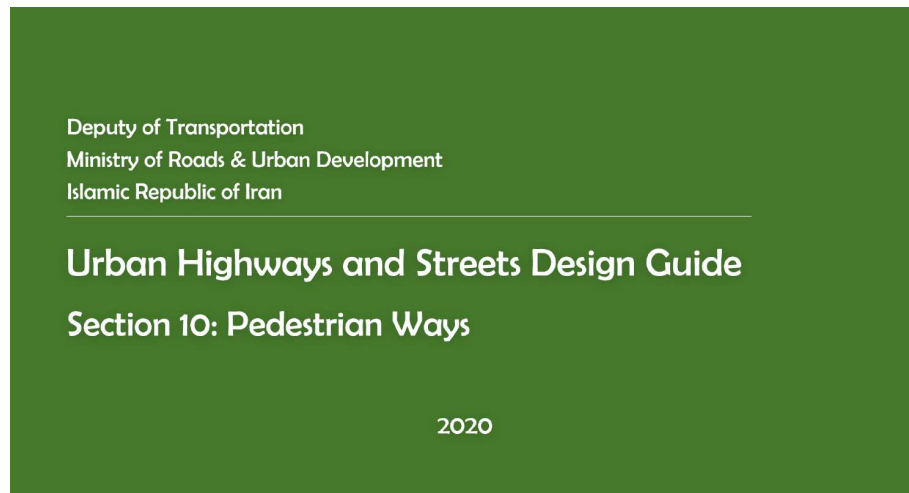


Figure 7 – standard of designing pedestrian path

4.1 bicycle

In Tehran a project which called “Bidood” (without smoke) has been initiated in Tehran. This project includes common smart bicycles which aims to mitigate air pollution, help to environment, increasing the health of citizens and decreasing traffic. Indeed, it is tried to promote the quality of Iranian society by raising the level of culture of society and using bicycle.

Of course, the permitted area for bicycle with common smart bicycles is only in 7 districts of Tehran and this service is not existed in whole of the city.

Everyday 180,000 commutes are doing by bicycles in Tehran. To have a more qualified commute by bicycle in city an application has been designed to help people to choose the safest and nearest path. Of course, it should be mentioned that riding bike in Tehran is so few and hasn’t been spread in this city yet. It needs various factors both in social and urban design to be imposed in city to increase the quality and quantity of riding bike in Tehran.

However, the standards of Bikeways have been published to be applied but implementing this issue needs more time and motivation.

Figure 8 shows the recent version of standards of Bikeways which was published in 2021.



Figur8 – the standards of bikeways

4.2 TOD

TOD is one of the ways which pedestrianization of city in combination with public transportation. In TOD it has been tried that the city doesn't be captured by automobiles. Air pollution can be mitigated by some techniques like improving the quality of walking in city and public transportation, mixing land uses and shortening of commutes.

These strategies are being followed in Iranian metropolitans such as Tehran. They try to improve public transportation and making cities walkable and mix land use to decrease carbon in Tehran.

5- Traffic district rules

Traffic district rules is always a main strategy in decreasing the air pollution which have been implemented for a long time with different strategies.

Traffic district rules is an old way to control the air pollution of Tehran. This role was implemented as issuing restriction for odd and even number of vehicles. It means that cars with odd number can enter in the traffic district in odd days and cars with even numbers can enter in traffic district in even days. In recent traffic rules for decreasing the air pollution, citizens of Tehran can travel in traffic district for 20 days in a year. According to authorities this new rule can decrease air pollution 6- 7 percent (sharg newspaper, 1399, p 155).

5.1 LENZ plan

LENZ is the abbreviation of "Low Emission Zone" to mitigate the air pollution. LENZ district is an area which has been created for improving the quality of air. Nonstandard vehicle with high pollution couldn't permit to arrive in this area and there are restrictions for these vehicles. There are special standards in this area for vehicles according to their pollution.

The number of all vehicles which arrive on LENZ district can be read by cameras and there are penalties for those vehicles which don't have technical exercise (Municipality of Tehran, p155).

6- Technical exercise

One of the ways of decreasing air pollution is technical exercises which prevent from the traffic of worn vehicles. 40% of air pollution of Tehran is resulted by worn vehicles. But in last year only 7% of vehicles go to the centers of technical exercise. In 2020 the capacity of the center of technical exercises were increased and 2 more technical exercise centers were added as well.



Figure 9- The center of technical exercise of Tehran city

7- 25 minutes city

A plan which is called 25 minutes plan is being prepared in municipality of Tehran which according it citizens can easily reach to their necessary daily service and there is no need to further commutes based on vehicles.

So, by mixing land uses, promoting the pedestrianization and enhancing the quality of transportation the time of commute decrease to max 25minutes.

This plan is supposed to be implemented in district 17 which is the smallest district of Tehran.

8- improving the fuel of vehicles

According to the experts one of the most important reasons of air pollution is nonstandard fuel for vehicles. The main reason of issuing tiny particles or droplets in the air is unqualified recent fuel. Omitting lead from fuel, mitigating issuing Azbest by banding using Azbest in brake pad, improving the quality of vehicles which will control issuing Co in air of Tehran and promoting the quality of fuel of vehicles are some activities of the municipality of Tehran.

9- installing the filter of smoke

45 filters for absorbing smoke were installed on buses in private section but it is a humble number in comparison with the whole number of buses. It is supposed to install filter on 500 buses as soon as possible.

Conclusion:

The city of Tehran is one of the most polluted cities of the world for many years. Unfortunately, citizens observe increasing the air pollution instead of decreasing!

So, solving this severe problem should be considered by authorities more seriously to achieve a livable city which help to improve the health of citizens.

Recently the air pollution caused the death of many citizens of Tehran or sent them to hospitals.

However, it needs to preserve the health of the citizens of Tehran by taking effective decisions to mitigate Carbon and fine articles in the air.

Pedestrianization and suitable strategies to expand it, creating qualified and public and extensive transportation in Tehran, banding of worn vehicles, improving the fuel of vehicles, mitigating daily commutes and making city walkable are some strategies which should be followed by the municipality of Tehran to make this city healthy as much as possible.

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