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Comparative Study of Urban Management Policy on Air Pollution Between Two Capitals of Iran and England

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Abstract: Now a days, the urbanization development has led to the growth of industrial units and subsequently an increase in environmental pollution including the air pollution. This air pollution is a hidden pollution which has been increased in most of the developing countries in recent years. This issue has been solved in developed countries and it has not been seen in developed countries since the early twentieth century. The continuation of failed policies on urban management has led to an increase in air pollution in most of the countries. In this regard, the big cities like London have been able to reduce this major problem by adopting an appropriate approach. This study investigates the policies and measures by two major capitals, Tehran and London, in this regard.

Key words: Policy, urban management, air pollution, England, Iran

INTRODUCTION

Now a days, the concentration of air pollutants has been rapidly increased due to the increased urbanization and industrialization in most of the big cities. Due to the establishment of more than ten million people and excessive construction of industries and factories in geographical area of Tehran along with especial geographic, topographical and climate situations, Tehran has become among the most polluted cities in the world. The air pollution is not only a subject to decisions by an organization but the government should consider it and offers solutions due to the totality of this case and its sensitivity. The reasons for pollutants and strategies to solve them require serious cooperation in which the Department of Environment, Ministry of Industry, Mine and Trade or institutions in the field of public transport play important roles in its prevention. There is a need for strict laws as macro policies and their continuous and accurate implementation along with continuous inspection and supervision as well as warning people who do not care about contamination and only considers their self-interest and misuse the legal gap and lack of adequate enforcement in this regard.

MATERIALS AND METHODS

Air definition: The air refers to a common definition for describing a mixture of gases each which create a thin layer around the earth. The composition of this mixture is remarkably constant from earth upwards up to 50 m.

Pollutant: It refers to a material which has a concentration more than allowable or normal concentration and has adverse effects on living organisms.

Definition of air pollution: The air population refers to the existence of one or more pollutants in concentration and duration of their harm for human, animal or plant or damage to human objects and attributes or their interfere in human comfort.

Types of pollutants and their sources: There are five famous types of major pollutants which cause more than 90% of air pollution as follows:

- Carbon monoxide (CO)
- Nitrogen Oxides (NOx)
- Hydro Carbons (HC)
- Sulfur Oxides (SOx)
- Particulate Matter (PM)

These matters are among the main air pollutants which are caused by different sources. According to a general classification, the air pollution sources are divided into two categories.

Natural resources of air pollution: Atmospheric air is polluted as a result of natural causes some of which are as follows: Smoke; ash and gases from burning woods; volcanic gases and ash; gas and smell of swamps.

Man-made pollutants: The main sources of these two types of pollution are as follows: Dust makers such as road construction; combustion such as different vehicles; manufacturing process such as steelmaking; nuclear processes such as nuclear reactors and (Shariatpanahi, 1994) (Table 1).

Table 1: Primary pollution sources and their quantities

	Weight of produced pollutant (million tons per year)					
Pollution sources	CO	Nox	HC	Sox	Particulates	Total
Transfers	0.111	11.7	19.5	0.10	0.70	143.9
Combustion	0.800	10.0	0.60	26.5	6.80	44.70
Industrial processes	11.40	0.20	5.50	6.00	13.1	36.20
Solid waste	7.200	0.40	2.00	0.10	1.40	11.10
Miscellaneous matters	16.80	0.40	7.10	0.30	3.40	28.00
Total weight of each pollutant	147.2	22.7	34.7	33.9	25.4	263.9

Air pollution management: Air pollution management refers to the ability to control air pollution by a coherent method. The air pollution control management consists of strategies and tactics which are done to reduce air pollution and protect the social health and welfare. According to the first point which should be noted, both strategy and tactics in air pollution have different meanings which are described as follows.

Air pollution control strategies: Strategy refers to the measures which will lead to controlled air pollution at regional or global scales in the long term. On this basis, the 5, 10 or 15 year goals are developed in strategies and the plans should be done to reduce air pollution and achieve these objectives. Strategies are different in terms of goals and performance and are created based on different principles. For instance, two policies of imposed fine and more taxes for pollutant industries or policy of regulating and applying higher standards are used as bases for developing the strategies and can lead to different results. In general, modern air pollution control strategies can be grouped into the following cases.

Cost-benefit analysis: The strategy based on the cost-benefit analysis is one of the strategies in air pollution management. This strategy seeks to select the best control option which is cost-effective in terms of cost for target conditions through evaluating the air pollution costs as well as estimation of costs and their comparison.

Air quality standards: The applied logic in this strategy is "to achieve zero harm" as a result of air pollution.

Emission standards: The range of emission in these standards has not been generally in line with overall objectives of national air pollution and it is in fact about contamination level depending on the source, metrology and topography surrounding the structure. This strategy is used in most of the European countries.

Economic incentives: The use of strategy based on the economic incentives is another way to control pollutants by industries. The tax on pollution production or polluting industries is one of the most common approaches in this strategy. The amount of industrial pollution is controlled in this project based on available equations, the amount of produced pollution by each industry and imposed taxes. This strategy should develop and calculate the taxes on pollution in a way that the industry owner comes to this conclusion that the use air pollution controlling tool is more effective than paying the costs.

Air pollution control tactics: Another aspect of air pollution control is its control in short-term episodes at urban and local scales. These measures are called the air pollution control tactics. These are called tactics since the specific plans and maneuvers are done based on them before creation of any special episodes in order to prevent these episodes. Each of these tactics lasts from 24 h up to several days. The comparison of strategies reveals that the orders applied in tactics are usually more severe than their measures but the fundamental point is that the imposed restrictions in tactics are eliminated and the previous situation continues after a period of episode risk (Bahrami and Zare, 2010). According to conducted studies, 80% of air pollution is caused by cars smoke in Tehran. The remaining 20% is related to factories and industrial sectors.

Air pollution control management strategies in Tehran: Tehran has an area of 373 km^2 with longitude of 17.01° and latitude of 76.11°. According to conducted studied, the south of Tehran is higher than its center and this height is increased by going far from center. East and West of Tehran are also higher than its center. Therefore, Tehran can be imagined as a irregular bowl and it has not been an appropriate place for a wide and big city due to its geographical and climatic location (Noel, 2010).

Status of air pollution in Iranian laws: The laws and regulation is the most important factor in management of air pollution control (Ghiyaseddin, 2006). Due to the importance and growth of air pollution and its associated issues, this issue is among the cases which are taken into account in laws of economic, social and cultural development programs in Islamic Republic of Iran and this has been among the most important environmental points

of such these programs some of which are as follows: Second development plan approved in 1994. According to the second development plan of Iran in Article (b), Clause 82, the government has become responsible for reducing the air pollution in seven cities at the same level as World Health Organization standards. According to this study, "The state is obliged to reduce the air pollution in Tehran, Mashhad, Tabriz, Shiraz, Arak, Shiraz and Isfahan at the same level as World Health Organization standards during the second development plan".

Third development plan: According to third development plan approved on 05/04/2000, due to the unfulfilled objectives of previous plan in the field of reducing air pollution and its increased in cities, more extensive and detailed attention is paid on air pollution unlike the second plan which considered the air pollution as a whole and without considering any enforcement for its implementation. The Clause C of Article 104 has enforced all manufacturing plants to match their profiles with environmental criteria and reduce pollution; otherwise they will pay fine in the case of failing to match with it. The Clause D of Article again endorsed the clause B clause 82 of second development plan based on the governmental task to reduce the air pollution in seven cities (Tehran, Mashhad, Tabriz, Shiraz, Arak and Shiraz) at the same level as World Health Organization standards. Due to the specific status of air pollution in Tehran, the lawmaker has considered special provisions and warranties in Clause (G) of Article 104 with the aim of reducing the air pollution in this city; some of them are as follows:

- Task of governmental agencies to fix the flaws in their vehicles (Clause 1)
- Task of Tehran Municipality to repair and modify vehicles with technical defects (Clause 2)
- Issuance of work permit for Taxis and minibuses in the case that they do not have any technical problems leading to air pollution (Clause 3)
- Projected financial assistance (Clause 4)
- Fourth development plan

The Fourth Development Plan has adopted policies to overcome air pollution for instance it has considered "The lack of self-announcement of pollution sources" as a crime and put it under Article 30 of law for air pollution prevention passed in 1995. According to Article 61 of this law, "The government must start the self-announcement period during the fourth plan in order to monitor the pollution sources. All manufacturing, service and infrastructural units should sample and measure their pollution and destruction and provide results to Environmental Protection Agency (EPA) based on instructions by EPA. The units which do not comply with obligations of this clause are included in Article 30 of law on the prevention of air pollution adopted on 23/04/1995. Furthermore, according to clause B of Article 62, the government is obliged to adopt a series of measures during the fourth plan to announce all of old motorcycles and old outdated.

Act to prevent pollution act of 1374: Before the enactment of this Act, the regulations on air pollution prevention adopted in 1975 was implemented but due to the difficulties and failures of this text and increasing air pollution and the need to evolve and change the prevention strategies, the law of air pollution prevention was adopted on 23/04/1995 in order to fulfill the Fiftieth principle of constitution. The Article 2 of this Act defines the air pollution and refers to general principle of "prohibition of any act to provide air pollution" and the second part of Article 1 also stresses on the need to comply with regulations and policies set out in this law for all systems and institutions and real and legal individuals (Mashhadi, 2013).

Fuel strategy: This strategy is generally defined based on the use of fuels, fuel change, combination of fuels, refined fuels and adding some materials to fuel. The fuel change and use of clean fuels are simple ways to reduce emissions from fuels. Generally, the coal is a pollutant but it is cheaper than oil and oil is also a pollutant but it is cheaper than natural gas. Therefore, the solid and liquid fuel change to natural gas can be a perfect option to reduce emissions if possible (Motesadi, 2008).

Exclusion strategy of old vehicles from transport system: Such this strategy has not been probably taken into account in other countries because the vehicles often have certain lifetime both in terms of time and passing distance in all countries.

Tax strategy: The imposed tax is one of the measures to improve and reform the urban traffic system. This strategy is called the tax on emissions and the judicial forces are used to implement it in most of the countries. In Iran, all public and private vehicles have to pay annual taxes and the complications of emissions are not prevented. The implementation of this strategy requires certain rules and regulations and their coherent implementation. There are appropriate rules for taxes and tolls in Iran but unfortunately its implementation is along with numerous problems. This strategy is discussed due to its wide

applications and has been taken into account as one of the air quality sustainability strategies. This strategy has emphasized on various duties and taxes on pollution emission (Motesadi, 2008).

Strategy of public transport system improvement: The conducted studies indicate that the strategy for more use of public transport system in traffic has not been seriously considered in Iran (Motesadi, 2008). In recent years, the use of Bus Rapid Transit (BRT) has been taken into account in Tehran. The development of such these systems requires accurate determination of their effectiveness in reducing the effects of air pollution and improving traffic. Public transport system is an integrated system in which the components are interconnected. The success and effectiveness of this system has been due to the safety, continuity and connectivity of its subsystems. The growing urbanization, increasing population, scattered settlements and far distance of workplace from house have made the use of personal cars inevitable in addition to creating the environmental consequences such as air pollution, increased travel time, reduced safety and overcrowded population for urban residents (Moeini, 2012).

Control strategy for polluting vehicles: Technical examination is one of the main strategies to control polluting vehicles. The purpose of technical examination sticker or label is a certification for inspection by authorized car technical examination headquarters or centers delivered to applicant on the right side of windshield (Clauses 7 and 12 and Article 1 of Traffic Regulation adopted on 08/06/2005). The legislator has first mentioned the Articles 37-45 on the need for technical certificate and the criteria and process for obtaining it. According to Article 37 of this regulation, driving all public transport vehicles is prohibited without technical certificate (Mashhadi, 2013).

Traffic management strategy: A number of motor vehicles are annually added to transport system and most of these vehicles are used in cities for urban transport. The most important step in this planning cycle includes the reduced number of driving vehicles, created traffic restrictions and improved traffic control systems and pollution plans. However, the cases such as created traffic area do not solely respond to reduction in pollution and the area of traffic control in Tehran is an evidence for this claim (Motesadi, 2008).

Public participation strategy: The changed public lifestyles and their tendencies toward luxury-orientation have made problems for them over the time. However, the world has found this important issue in recent years and trying to conserve the environment and its health by getting away from such this lifestyle. Tehran and some metropolitan cities suffer from air pollution and the car is one of the reasons which endanger the health and environment. According to the studies, the car is creates >70% of air pollution while the single-seater cars are frequently seen in the streets and occupied the highest space of streets. According to this survey, 53 percent of people said that they did not use their personal cars on Tuesday and 29% were unaware of this plan and the others said that had to use their personal cars despite being informed of this plan. Furthermore, a project was implemented in Scandinavia and the European Union and the Norwegian people asked government to prohibit the personal vehicles and motorcycles in city, so people will only use public transport until 2019 (Bahrami and Zare, 2010).

RESULTS AND DISCUSSION

Air pollution control management strategies in London: Like Tehran, the road transport is the main cause of air pollution in London and thus the main policies are adopted on this regard or reduction of vehicle production or their numbers.

Status of air pollution in laws of England: The Great Britain approved the "Clean Air Act" in response to "Great Smog of 1952" in London and thus put a series of measures including the determination of controlled areas in terms of smoke on the agenda. London was so similar to Tehran in those days.

Adoption of clean air act in 1956: Despite, the heavy pollution of London in the 1950s, its parliament passed the Clean Air Act in 1956. According to this act, the burning the coal at home was prohibited in London. The factories without necessary standards were transferred to rural and further areas. Furthermore, according to this act, the entry to central regions of London required paying more tolls as taxes. Moreover, under this act, the strict rules were imposed to car manufacturers within the framework of Europe Union to product the vehicles with clean fuel. Furthermore, the polluting vehicles such as buses were replaced with buses with more capacity and less pollution in London.

Mayor's air quality strategy document: The mayor should prepare and publish a document entitled "London air quality strategy document". London air quality strategy document should include the Mayor's proposed policies and plans for following cases implementing the policies in strategy document prepared and published by

Interior Minister in Greater London in accordance with Section 80 of Environment Act approved in 1995 (National Air Quality Strategy). Achieving the standards and objectives relating to air quality in Greater London in adopted regulation on the basis of Section 87 (2) (A) and (B) of that law. However, it may cover other similar plans and policies to improve air quality in Greater London approved by mayor. London's air quality strategy document also covers information about the following items:

- Air quality in Greater London and possible air quality in Greater London in the future
- The measures which are going to be taken by competent authorities, London Transport organization and London Development Agency to implement air quality strategy document of London
- The individual or institutional measures which are encouraged by municipality to implement the air quality strategy document in London
- The mayor should consider the following cases in preparing or amending the air quality strategy document in London

The air quality review and assessment which are done by local authorities in Greater London in accordance with Section 82 of Environment Law approved in 1995. Any determination of air quality management area by a local authority in Greater London in accordance with section 83 of that Act. Any designed plan to achieve air quality standards in Greater London by a local authority in accordance with Section 84 (2) (B) of that Act. Any guidance on the content of air quality strategy document in London prepared and published to implement the strategy document by Interior Minister in accordance with section 80 of that Act (National air quality strategy). The mayor should consult the following references to prepare or amend the air quality strategy document in London:

- Department of environment
- Any local authority which has authority area borders with Greater London

When the Mayor amends the London's air quality strategy document, he should must publish its modified version. According to this act, any referral to London's air quality strategy document means the referral to amended version of London's air quality strategy document otherwise the conditions require other measure. (Farshid, 2014).

Strategy for using control systems: The main method refers to automatic control of gas emissions based on installing the control systems at the bottom of outlet pipe. The control systems of gases and vapors are easy and cheap and most of them have an activated carbon absorption machine with channels of gases and vapors emitted to absorbent. The catalyst is among these control systems. The strategy for using these control systems is less applied in Iran, for instance, non-standardized fuels, the need for maintaining and changing the fuel after a certain distance, the lack of domestic production and incompatibility of domestic systems with conditions of cars in Iran (Motesadi, 2008).

Strategy for using hybrid and electric vehicles: The new model of London taxies called TX5 which will joined in transport cycle of this city in 2017 will be built based on the technology of Chinese electric vehicles. This new model has been designed by London Taxi Company. This car can continue moving even after finishing the battery through its gasoline engine. This new taxi will be released exactly before implementation of new laws in January 2018 and it will enforce all taxi services of this city to use the cars without pollution at least for 50 km.

Tax payment strategy: London is the largest and most populous city among the members in the European Union. Numerous methods have been utilized to cope with air pollution problem and led to good results. According to one of these programs implemented since February 2003, the people who want to enter the central London by cars should pay tolls. According to studies, the use of this method will lead to significant reduction in traffic volume and increased average vehicle velocity which in turn has led to lower air pollution. Furthermore, the London's municipality takes £12 per day from diesel vehicle drivers to enter into the area without air pollution until 2020. The traffic control and reduction of diesel vehicles is one of the main causes for coping with air pollution in London.

Strategy to capture and collect particles

Calcium adhesive spray on the streets: This will absorb pollution which may be transmitted by the air and thus the pollution is stopped before hurting the citizens. According to this project, the streets are first cleaned by a special machine like the dust-cleaner machine and washed by a jet. At the next stage, the street surface is covered with water-calcium solution and other additives by a machine like the snow removal machine and a kind of special sprinkler. When finished, the street surface seems normal and there is nothing on it but Mayor Johnson knows the impact of this measure important and vital. This adhesive leaves the particles called PM10 like soot on the street. PM10 is produced by smoke of vehicle exhausts and worn brakes and tires and cause serious diseases

such as asthma. The cardiovascular diseases, lung cancer and even premature death are all the serious diseases caused by PM10 (http://www.gooyait.com/1390/09/02/calcium-based-adhesive-applied-to-london-roads-to-prevent-air-pollution.html).

Dust compression machines: The utilization of dust compression machines on the surface of roads is another step in reducing pollution in this city. By moving on the surface of streets, these machines remove dust and thus prevent from entering to air (http://www.magiran.com/npview.aspID=2661632).

CONCLUSION

Unfortunately, the Iranian policy on air pollution has not been preventive and the performance of this country has been more based on the eliminating the issue appearance in the form of closing the schools rather than factories and polluting factors and identifying the factors and preventing them or making the right and practical decisions. It seems that the pollution of Tehran and continuation of this situation are due to the lack of unit management system in air pollution as this leads to systems which do not have power or effectiveness. The unit pollution management should have power. In other words, the Department of Environment should ask the systems to do this legal task. The Department of Environment seems is weak in this regard and has not been practically able to convince the systems such as the Ministry of Oil to produce the high-quality fuel as soon as possible. A healthy environment requires a capable organization.

SUGGESTIONS

- The need for prosecution organization in air pollution issue
- Establishment of strict monitoring committees and successive inspections
- Use of ethanol instead of MTBE in gasoline
- Adopting the prevention and control policies on vehicle pollution such as light, medium and heavy vehicles and motorcycles (Environmental Protection Agency, Ministry of Industry and Mines, the Interior Ministry, municipalities, Management and Planning Organization)
- Adopting the economic policies for modernization and improvement of moving vehicles and cars (Interior Ministry)
- Reducing the consumption of heavy fossil fuels (such as gasoline, gas oil, fuel oil) (Environmental Protection Agency, Ministry of Industry and Mines, Ministry of Oil, Ministry of Energy, Management and Planning Organization)
- Improving the quality of energy carriers (Ministry of Oil)
- Increasing the rate of clean energy in activities with much preparation. (Ministry of Oil, Ministry of Energy, Ministry of Industry and Mines)
- Strengthening the necessary legal bases for reducing the pollution by stationary sources (industrial, commercial, residential, power plants,...) (Environmental Protection Agency, Ministry of Housing and Urban Development, Ministry of Industry and Mines and Ministry of Oil)
- Paving the ways to develop the clean technologies with emphasis on new industries and renovation of industries (Ministry of Oil, Ministry of Energy, Ministry of Industry and Mines)
- Continuation of programs
- Cooperation of all governmental and non-governmental agencies in reducing air pollution
- Optimal management of urban transport using the latest technology
- Criminal protection as a last resort

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