Contract number:2010/232231

Air Quality Governance in the ENPI East Countries

National Pilot Project – Azerbaijan

"Improvement of Legislation on Assessment and Management of Ambient Air"

Draft National Strategy on AQAM

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Summary

PROJECT TITLE: Improvement of Legislation on Assessment and Management of Ambient Air

CONTRACT NUMBER: 2010/232231

COUNTRY: Azerbaijan

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ABBREVIATIONS

AQAM	Air Quality Assessment and Management
CLRTAP	Convention on Long-range Transboundary Air Pollution
EIA	Environmental Impact Assessment
EMEP	European Monitoring and Evaluation Programme
EU	European Union
IPCC	International Panel on Climate Change
GEF	Global Environmental Facility
GHG	Greenhouse gas
NGO	Non-governmental Organization
MAC	Maximum allowed concentration
MENR	Ministry of Ecology and Natural Resources
MED	Ministry of Economic Development
MoH	Ministry of Health
MoT	Ministry of Transport
OSC	Open Stock Company
PSC	Project Steering Committee
REC	Regional Environmental Center
SOCAR	State Oil Company of Azerbaijan Republic
TACIS	Technical Assistance for the Commonwealth of Independent States
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UNESCO	UN Educational, Scientific and Cultural Organization
UNDP	United Nations Development Program
USSR	Union ofSovietSocialist Republics
WB	World Bank
WHO	World Health Organization

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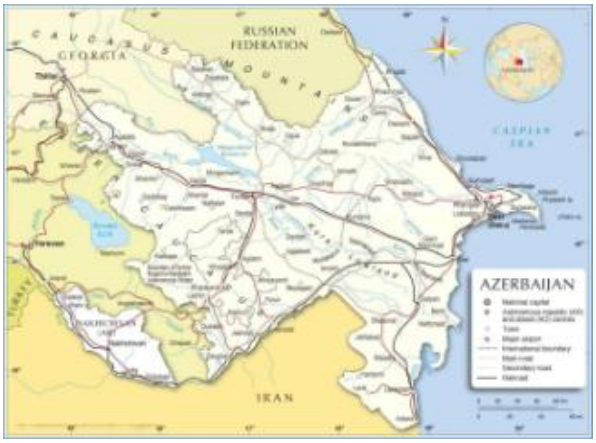
1. INTRODUCTION



The Republic of Azerbaijan has a total area of 86.6 thousand km^2 and is situated in the Southern Caucasus being a biggest country of the region. Mountains dominate the northern, southern, and western regions of Azerbaijan, covering roughly 43% of the country, and flatlands run throughout the centre of the country, accounting for the other 57% of Azerbaijan's land area. Forests make up roughly 12% of the total land area.

Azerbaijan's population in 2012 was 9.235 million, as compared to 8.5 million in 2006. About 52.9% of the country's citizens reside in urban areas and 47.1% in rural areas.

Since 1995, Azerbaijan has started to implement market oriented reform policies for transition from a planned to a free market economy. After independence it was evident that there was a need to initiate reforms to transform the political and socio-economic system, to form an independent national economy system, based upon a democratic state system, including free market relations.

Throughout 20-years period of its independence, Azerbaijan has constantly been improving its environmental protection system, including institutional and legislative base. Along with adaptation of more than 40 environmental laws, the country has taken strategy of harmonization of the laws to international standards and approximation to relevant EU directives.

Azerbaijan has also ratified up to 20 international conventions related to environmental conventions. It should be mentioned that 3 of them are directly related to protection of air quality: The Convention on Long Range Transboundary Air Pollution, the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer and the United Nations Framework Convention on Climate Change.

It should be noted that during the previous decade, Azerbaijan's environmental policy focused on remediation of environmental burdens from the past, e.g. clean-up of contaminated soil, and on waste and water management. However, this situation changed recently and government provides particular attention to measures for improvement of air quality (e.g. application of modern technologies at production units with less emission and so on).

Currently, there is an urgent need for improvement of national legislation on air quality assessment and management, in particular approximation of main laws to relevant EU directives, as well drafting action plan related to air quality management for capital city – Baku and finally, developing National strategy on air quality assessment and management.

Above-mentioned needs are addressed under current National Pilot project. National project intends to achieve project goals through implementation of project activities in 3 directions: Comprehensive overview and gap analysis of the existing legislative and institutional framework, Draft action plan for Baku and Draft National Strategy on AQAM.

Current report describes draft national strategy on air quality assessment and management in Azerbaijan.

2. AIR QUALITY OBJECTIVES

2.1. OVERVIEW OF AIR POLLUTANTS RELEVANT TO AZERBAIJAN

Monitoring of pollution of ambient air in Azerbaijan is conducted by the Department of National Environmental Monitoring in accordance with the statute "On the rules of implementation of state monitoring of the environment and natural resources" prepared by the Ministry of Ecology and Natural Resources, and approved by the resolution No.90 of the Cabinet of Ministers of the Republic of Azerbaijan dated 1 July, 2004.

There are 3 categories of observation and control stations in order to determine concentration of sulphur dioxide, carbon monoxide, nitrogen dioxide, dust, phenol, and other noxious substances. Observations on the pollution of ambient air are carried out at stationary and mobile stations. Stationary and mobile stations are supposed to be established by taking into account the area, landscape, industrial development, mobile pollution sources, and number of population of each city (settlement) as follows:

- 50 000 inhabitants - 1 monitoring station;
- 50 000-100 000 inhabitants - 2 monitoring stations;
- 200 000-500 000 inhabitants - 2-3 monitoring stations, etc.

Monitoring and observation of pollution of ambient air is regularly conducted at 26 observation stations located in eight big industrial cities of the Republic of Azerbaijan (Baku, Sumgayit, Nakhchivan, Ganja, Mingachevir, Shirvan, Lankaran, Sheki),covering basic polluting ingredients (dust, sulphur dioxide, nitrogen dioxide and carbon monoxide), and specific harmful substances corresponding to the industrial profile of each city. The number of stations is compliant with the above-mentioned criteria, except for Baku city, where there are fewer stations than it would be necessary.

Figure 1: Map of monitoring stations in Azerbaijan

Table 1: Monitoring stations in Azerbaijan

Station #	Address	Analysed substances
Baku city		
No 5	Sabail district, GurbanAbbasov 16	Sulphur dioxide, nitrogen dioxide, carbon monoxide, soot, hydrogen sulphide
No 15	Nizami district, G.Garayevave. 71	Nitrogen dioxide, carbon monoxide, soot, hydrogen sulphide, furfural
No 17	Narimanov district, HeydarAliyevave. 66	Dust, soluble sulphates, nitrogen dioxide, nitrogen monoxide , carbon monoxide, soot, sulphuric acid, formaldehyde, furfural
No 19	Binagadi district, micro-district No 9 Mircalal str. 127	Nitrogen dioxide, hydrogen fluoride, solid fluoride, chlorine, formaldehyde
No 38	Khatai district, NZS sett.,Babakave. 66.	Dust, sulphur dioxide, nitrogen dioxide, hydrogen sulphide, ammonia, formaldehyde, furfural
No 39	Sabail district, Bibiheybatsett., Maktabli str. 40	Dust, sulphur dioxide, nitrogen dioxide, carbon monoxide, hydrogen sulphide
No 40	Sabunchu district, Mammadaliyev str. 6	Dust, sulphur dioxide, nitrogendioxide, carbon monoxide, hydrogen sulphide, furfural
No 48	Yasamal district, Sharifzadeh str.174	Dust, sulphur dioxide, nitrogen dioxide, carbon monoxide, soot, formaldehyde, furfural
No 49	Khatai district, Khudu Mammadov street 3	Nitrogen dioxide, sulphur dioxide, carbon monoxide, soot, hydrogen sulphide
Sumqayit city		
No 1	S.Vurgun street	Dust, sulphur dioxide, nitrogen dioxide, carbon monoxide, solid fluorides, hydrogen fluoride, hydrogen chlorine, ammonia
No 2	Sulh street, 34th settlement	Dust, sulphur dioxide, carbon monoxide, Nitrogen dioxide, solid fluorides, hydrogen fluoride
No 4	17th microregion, avtostop	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide, soluablesulpahtes, nitrogen oxide, clorine, hydrogen chlorine, ammonia
Ganca city		
No 1	Ganca, Regional Hydro Meteorology Station	Sulphur dioxide, nitrogen dioxide, hydrogen sulohide
No 3	H.Hacıyev street	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide, solid fluorides, hydrogen fluoride, sulfuric acid
No 5	H.Aliyev avenue	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide, nitrogen oxide, hydrogen sulphide
No 8	Z.Mammadov street	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide, hydrogen sulphide
No 9	F.Amirov street	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide, solid fluorides, hydrogen fluoride, sulfuric acid
Mingachevir city		
No 1	Chimerlikroad .	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide
No 2	M.Maqomayev street, 77	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide, phenols
No 3	H.Aliyev avenue	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide, soluablesulpahtes, nitrogen oxide, phenols

Station #	Address	Analysed substances
No 4	Right bank	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide
Sheki city		
No 1	Sherbablar street, 8	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide
Shirvan city		
No 1	28 May street	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide
Lankaran city		
No 1	H. Aliyev street, 30	Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide
Nakhchivan city		
No 1		Dust, sulphur dioxide, carbon monoxide, nitrogen dioxide
No 2		Sulphur dioxide, carbon monoxide, nitrogen dioxide

The following analysis of current ambient air pollution trends in Azerbaijan is based on the data from 9 monitoring stations in Baku and 17 stations in other 7 major cities (Sumqayit, Ganca, Mingachevir, Sheki, Shirvan, Lankaran, and Nakhchivan) for the period from 2005 to September 2013 (please refer to Annexes 2 to 12 for more detail). This analysis focuses on the pollutants, which are regulated in the EU (NO_2, SO_2, CO) and are measured in Azerbaijan, as well as on other pollutants (dust, HF, formaldehyde), which show noticeable exceedances of the national limit values (MAC_{AD}).

By far the highest levels of pollution in Azerbaijan are caused by NO_2. Daily NO_2 concentrations exceeded national limit values (MAC_{AD}, 40 μg/m^3) during the entire period at all 9 monitoring stations in Baku (58% of days with exceedances on the average) and most stations in the other cities (39% of days with exceedances on the average). Annual mean concentrations exceeded EU limit value (40 μg/m^3) at all stations in Baku, Sumqayit, Shirvan, Lankaran, and Sheki. Particularly high levels have been measured at the monitoring stations number 17, 38, and 48 in Baku, as well as all stations in Sumqayit. NO_2 concentrations remain reasonably stable over the years in the major cities except Baku, where slight increase of annual mean values can be observed over the entire observation period in most stations. Sharp decrease of pollution in Baku in 2013 can be explained by the fact, that NO_2 concentrations have a tendency to increase in winter months, and the data for October-December 2013 were not yet available at the time of writing. Figures 2 to 6 illustrate the above analysis. Please refer to Annexes 2 and 3 to this report for the complete data set.

Figure 2. Annual mean NO2 concentrations in Baku, µg/m3

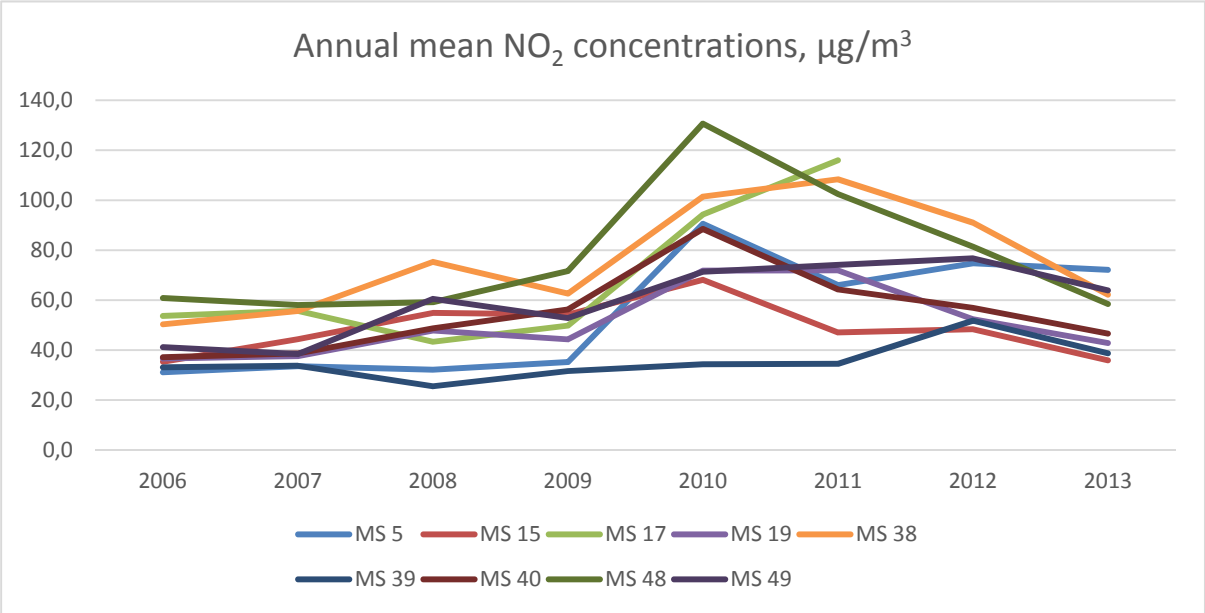


Figure 3. Annual mean NO_2 concentrations in 7 major cities, µg/m^3

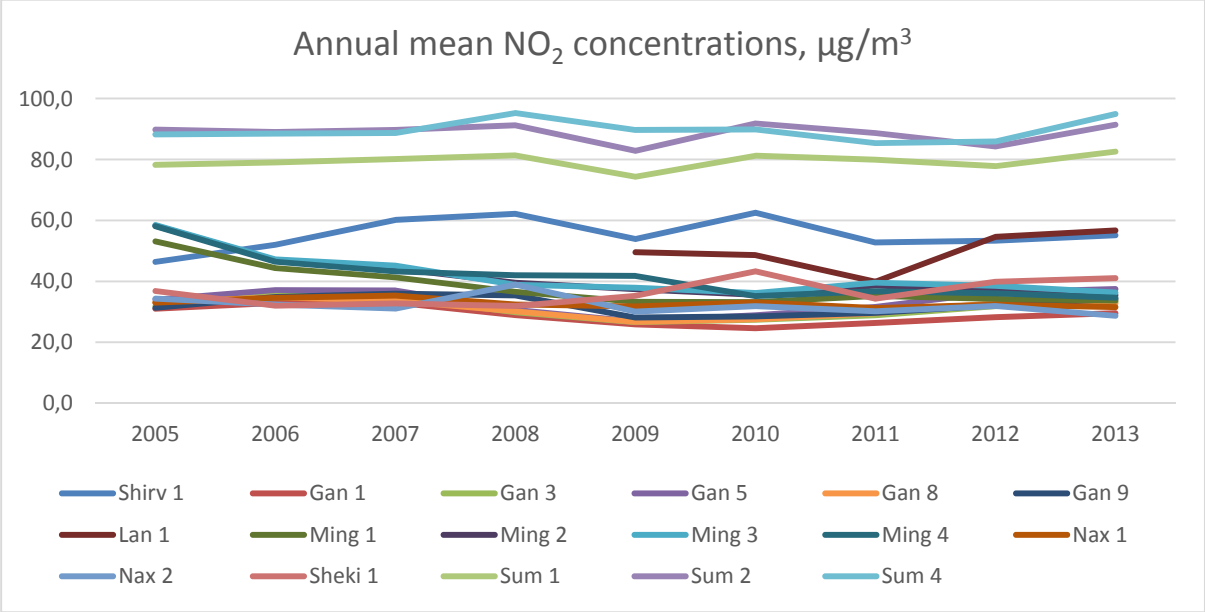


Figure 4. % of days when MAC_{AD} (AZ) for NO_2 was exceeded in Baku

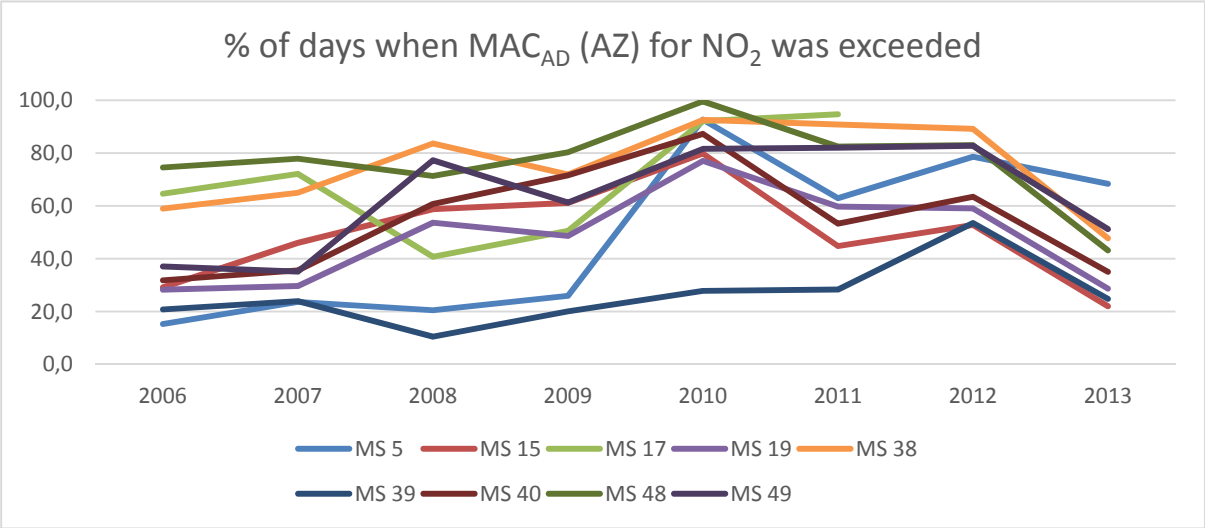


Figure 5. % of days when MAC_{AD} (AZ) for NO_2 was exceeded in 7 major cities

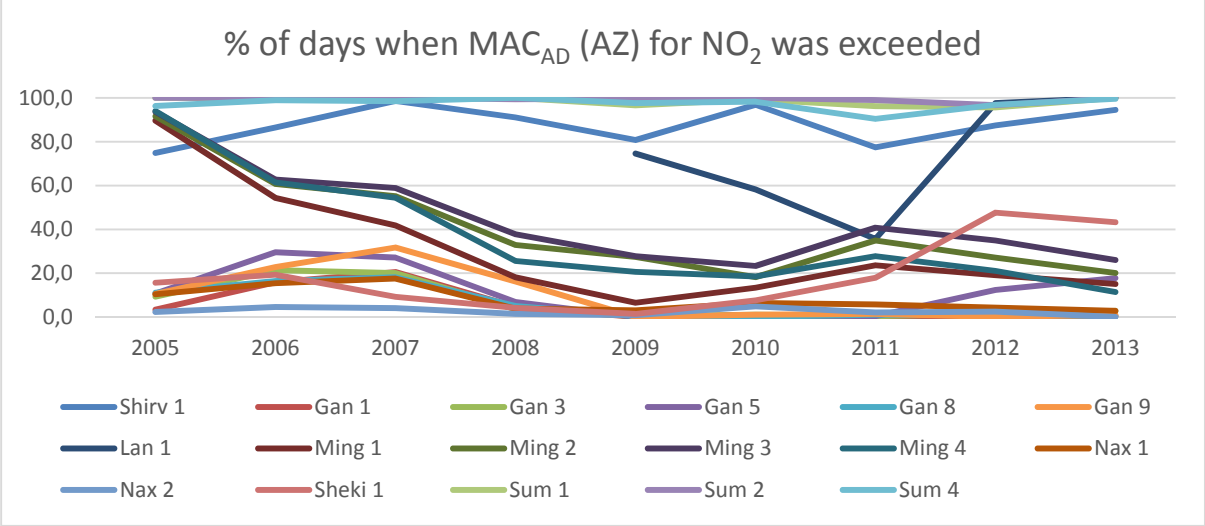
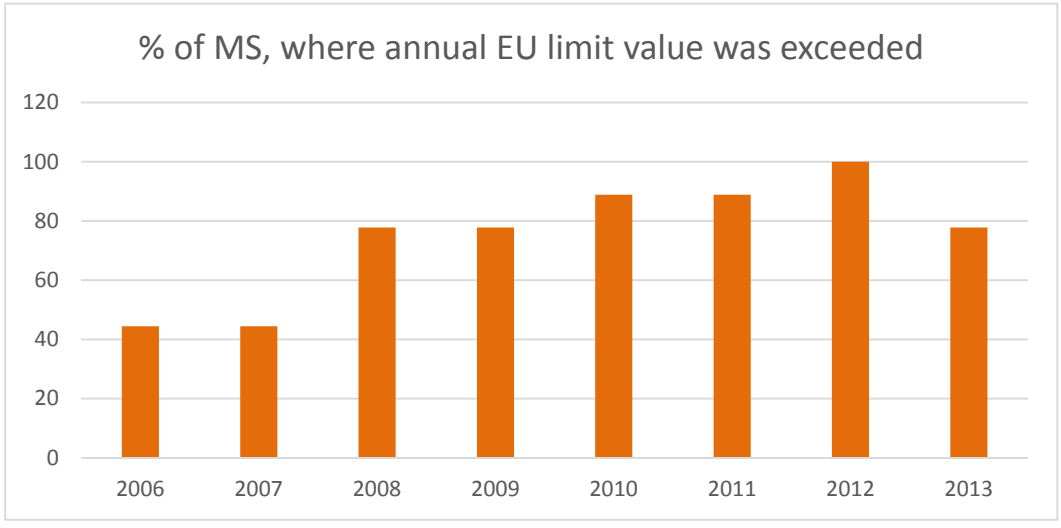


Figure 6. % of monitoring stations in Baku, where annual EU limit value for NO_2 was exceeded



The only other two pollutants, which are regulated by the EU legislation and which are measured at ambient air quality monitoring stations in Azerbaijan are SO_2 and CO. SO_2 pollution seems to be a local issue. In Baku it appears to be of minor concern and its long term average concentrations show decreasing trend, SO_2 daily concentrations have never exceeded EU limit value (125 µg/m^3) since 2005, while exceedances of MAC_{AD} (50 µg/m^3) are insignificant (Figure 7). In the rest of the country long term concentrations tend to increase. Particularly in Shirvan, Lankaran, and at both monitoring stations in Nakhchivan the long term averages are high and exceedances of MAC_{AD} are regular (Figures 8 and 9). SO_2 monitoring results are attached as Annexes 4 and 5.

Figure 7. Annual mean SO_2 concentrations in Baku, µg/m^3

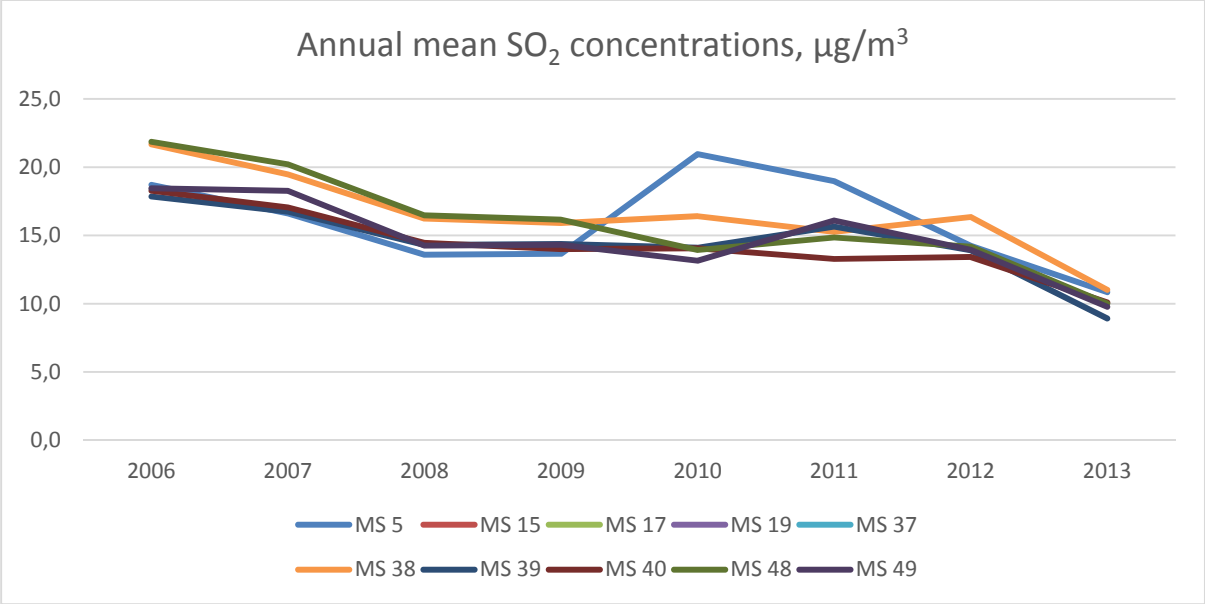


Figure 8. Annual mean SO_2 concentrations in 7 major cities, µg/m^3

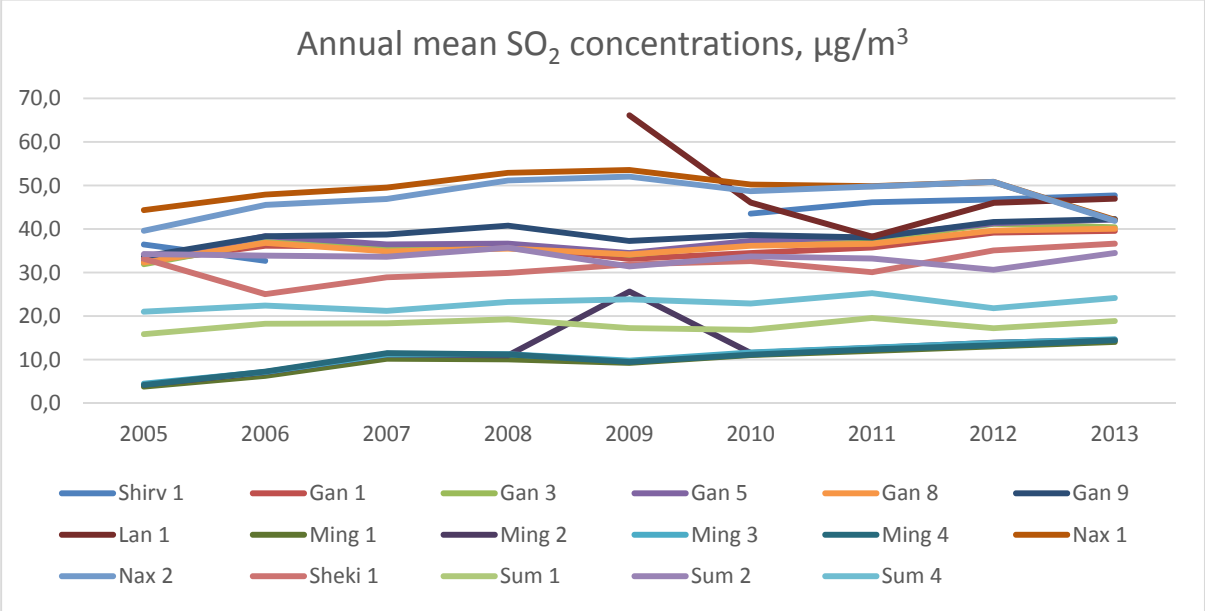
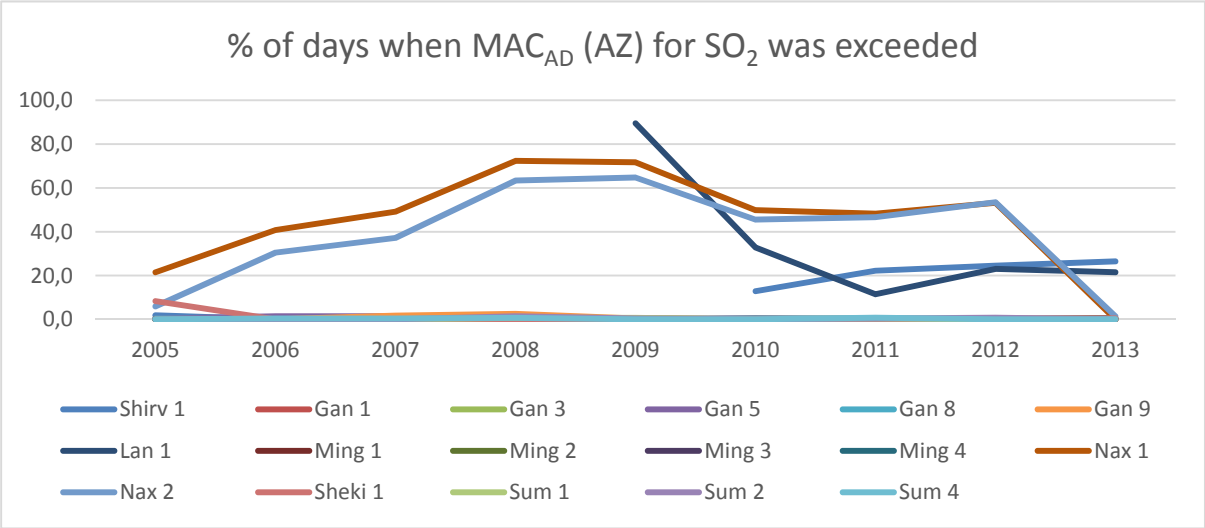
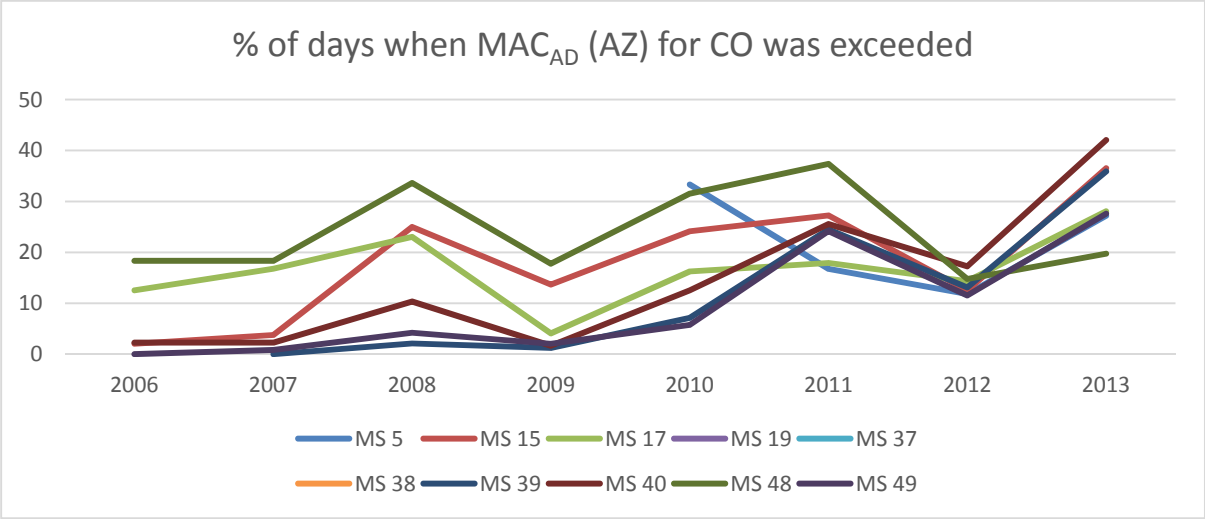


Figure 9. % of days when MAC_{AD} (AZ) for SO_2 was exceeded in 7 major cities



CO does not appear to pose immediate threat in most of the country, though it has be watched closely, especially as annual averages have a tendency to increase in Baku and – since 2009 – also in four other cities, where monitoring stations are located. In Baku MAC_{AD} (3 mg/m^3) exceedances have been reported during the last six years at all stations (Figure 10). Due to different averaging periods it is not possible to directly compare CO measurement results (3 times a day, averaged to 24-hour period) with the EU limit value (8-hour rolling average), but, as the EU limit value is 10 mg/m^3, exceedances are most unlikely. Monitoring data sets for CO are attached as Annexes 6 and 7.

Figure 10. % of days when MAC_{AD} (AZ) for CO was exceeded in Baku



Data on ambient concentrations of dust in Azerbaijan appear to contain systematic errors, thus have to be considered with utmost caution (Figures 11 and 12, Annexes 8 and 9). It is obvious, that results from nine monitoring stations in Baku from 2006-2012 significantly differ from the measurements at the same stations in 2005 and 2013 and, moreover, from measurements at 16 stations in six other cities.

Figure 11. Annual mean dust concentrations in Baku, µg/m^3

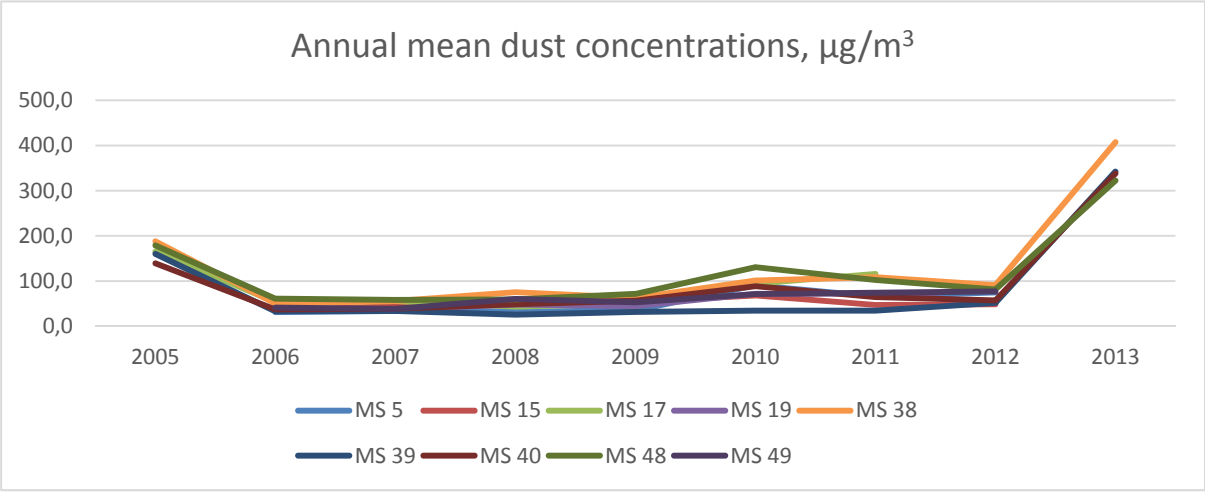
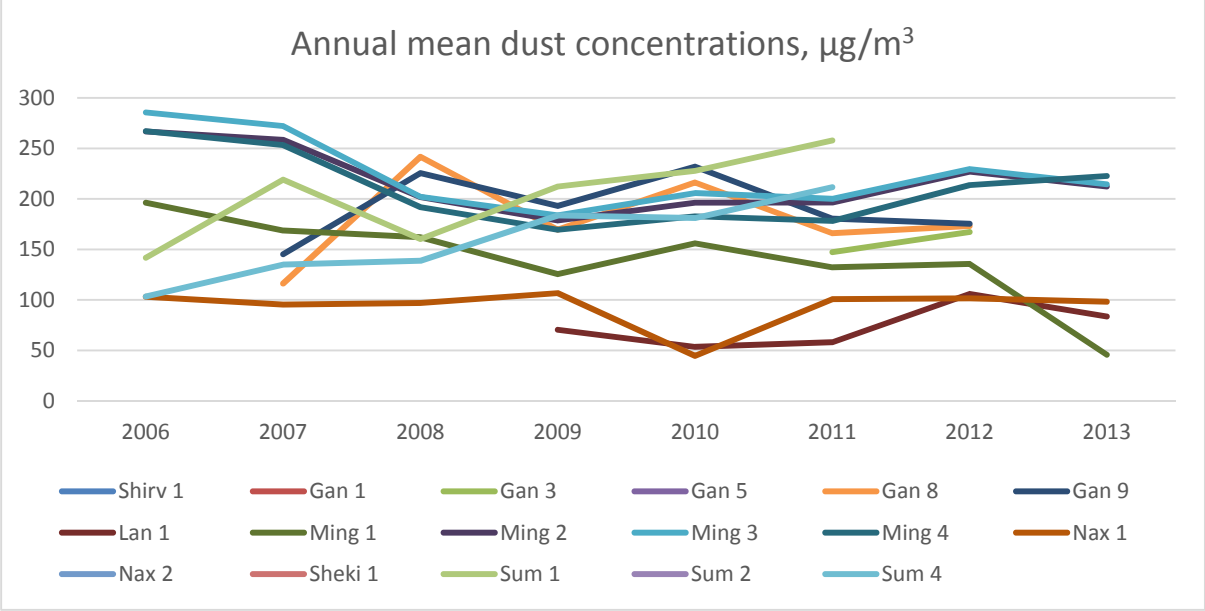


Figure 12. Annual mean dust concentrations in 6 major cities, µg/m^3



Even considering the set of data from Baku in 2006-2012, concentrations of dust in ambient air are rather high, though exceedances of MAC_{AD} level (24-hour average concentration of 150 µg/m^3) are not very frequent, in the range of 5 to 15% of all days with observations. Moreover, it should be stressed, that concentrations of small dust particles – PM_{10} and $PM_{2.5}$, which are considered to be priority pollutants in the EU, are directly correlating with the concentration of total dust. A TSP/PM_{10} ratio 1.35 (*A report on Guidance to Member States on PM_{10} monitoring and inter-comparisons with the reference method. EC working group on particulate matter, 2002*) can be applied for a quick analysis of the magnitude of the problem. Considering the entire Azerbaijani data set for the whole period 2005-2013, observed dust concentrations would mean, that both PM_{10} annual limit value (40 µg/m^3) and daily limit value (50 µg/m^3, not to be exceeded more than 35 times a calendar year) would certainly be exceeded in most stations for most years (Figures 13-14).

Figure 13. Calculated annual mean PM_{10} concentrations, µg/m^3 in Baku on the basis of dust measurements

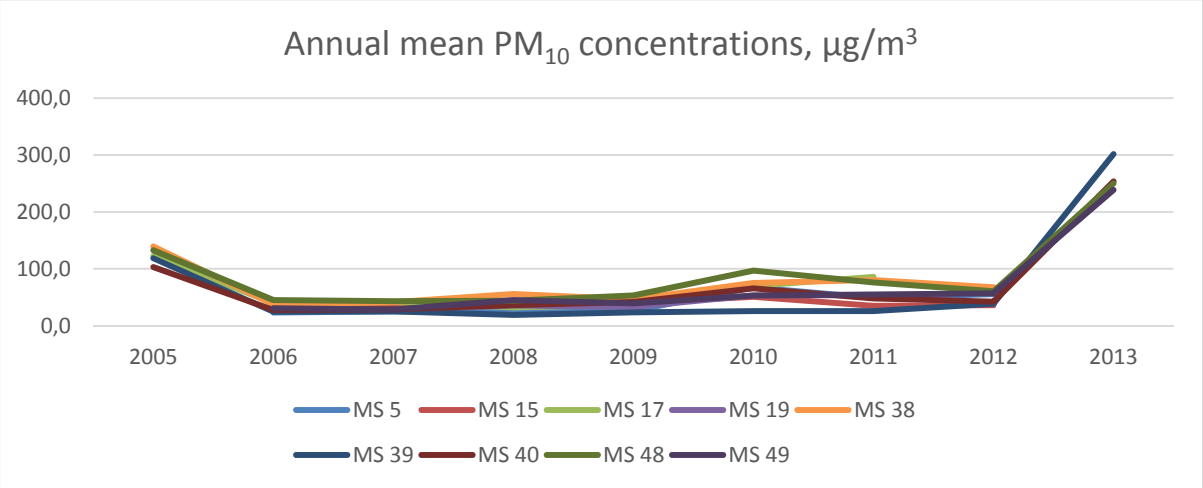


Figure 14. Number of days when EU limit value for PM_{10} was likely to be exceeded in Baku

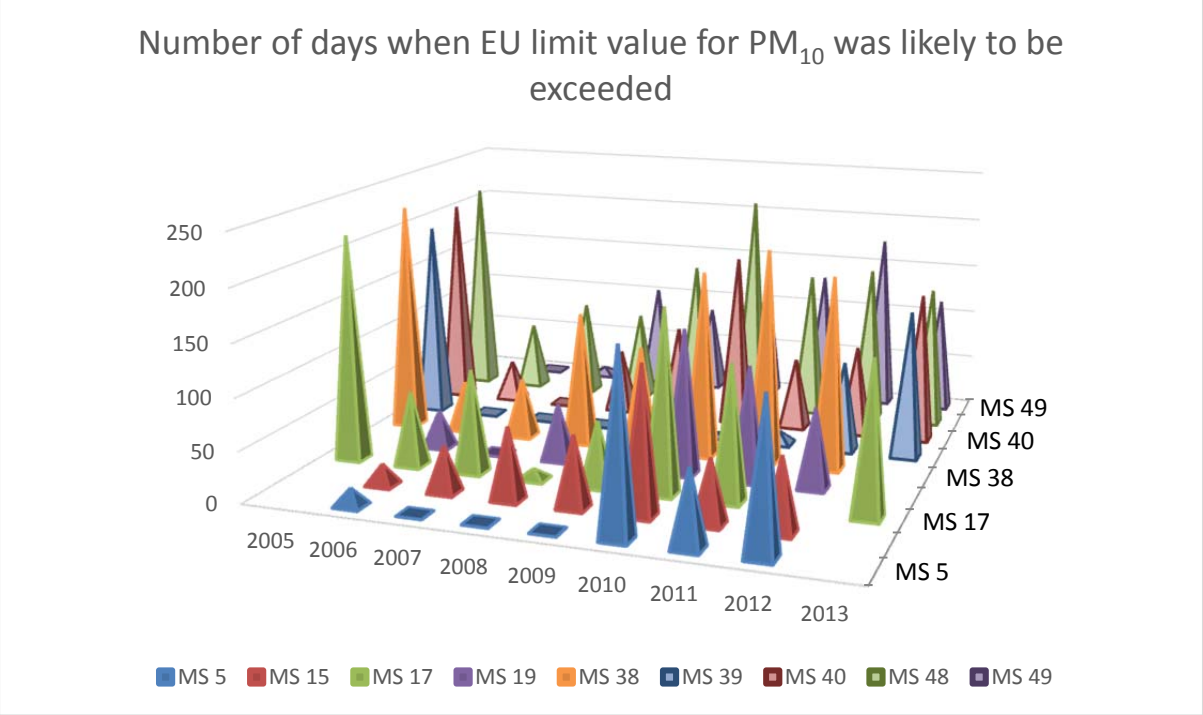


Figure 15. Calculated annual mean PM_{10} concentrations, µg/m^3 in 6 major cities on the basis of dust measurements

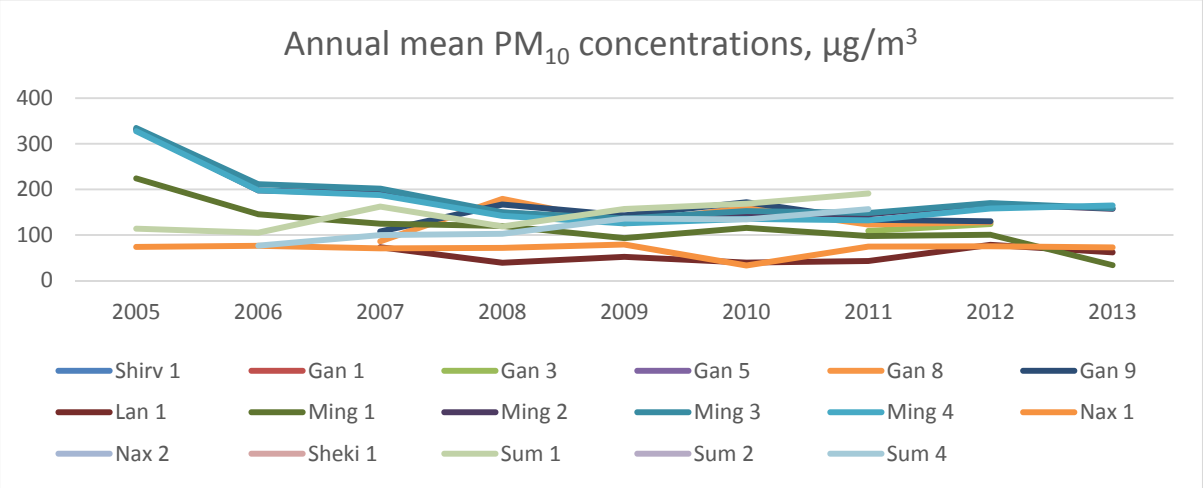
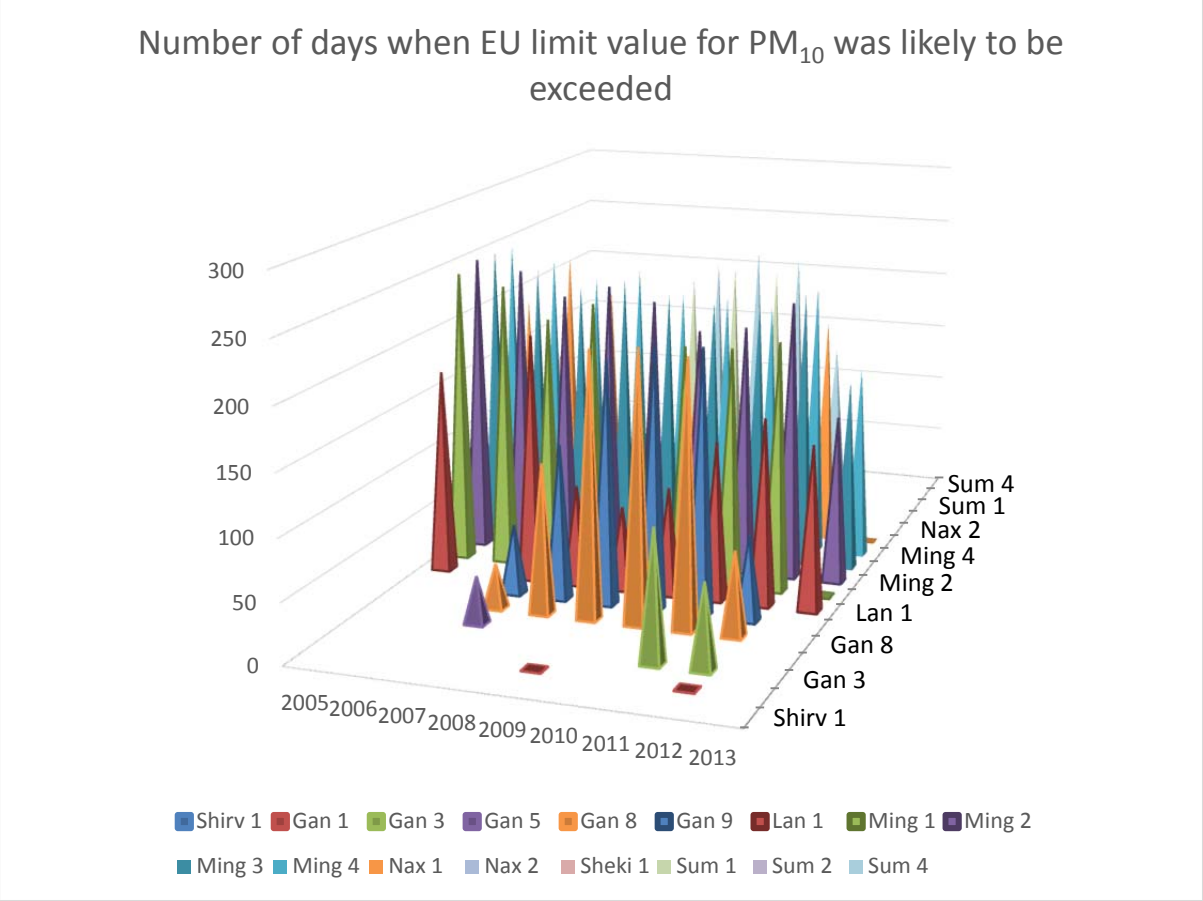
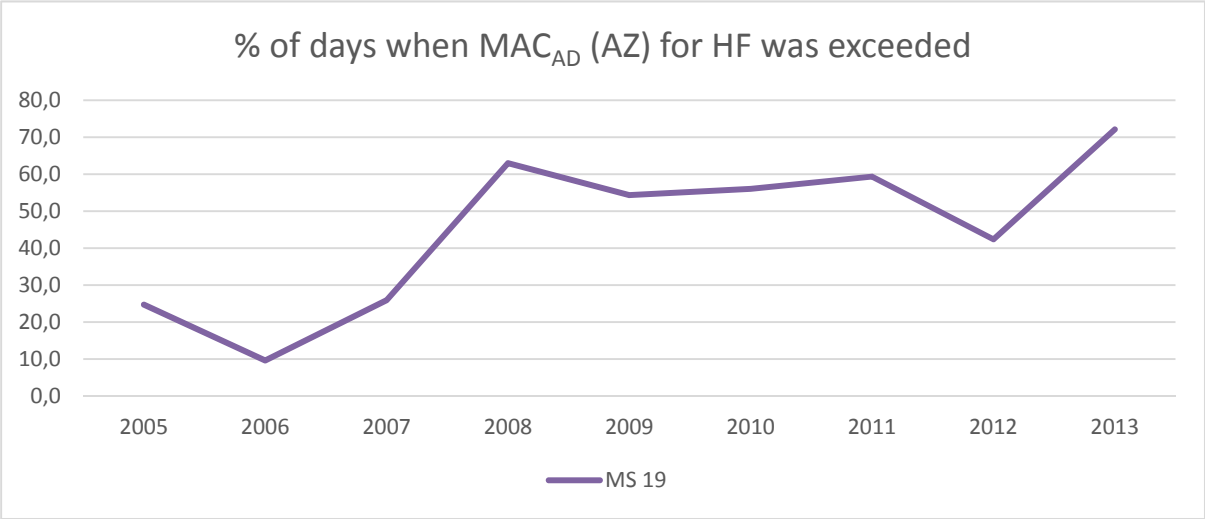


Figure 16. Number of days when EU limit value for PM_{10} was likely to be exceeded in 6 major cities



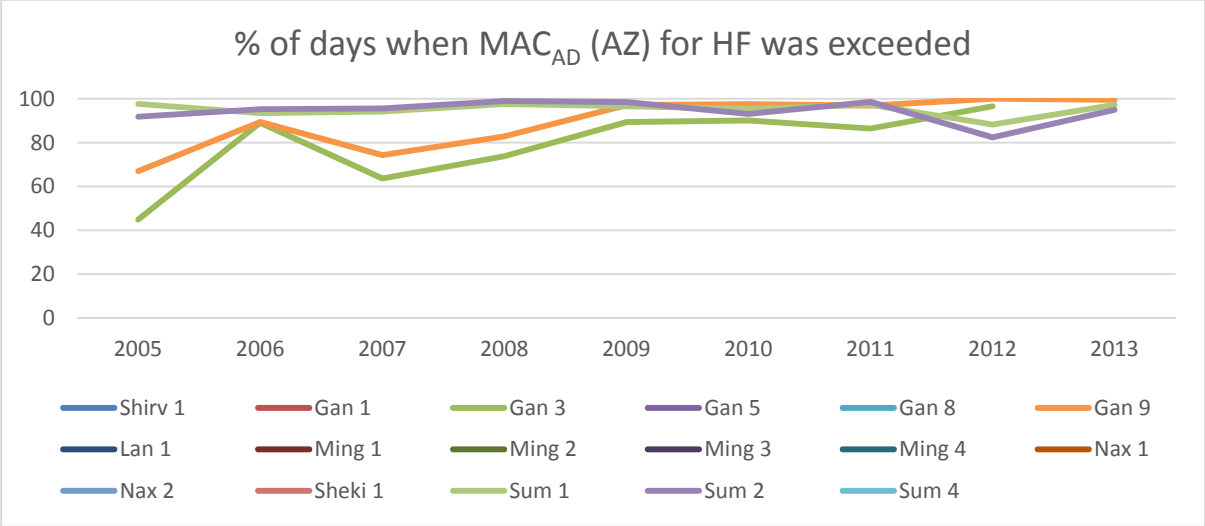
HF concentrations in Baku are being measured only at one monitoring station in Baku (number 19). It appears, that MAC_{AD} (5 µg/m^3) has been exceeded in more than 50% of days, when measurements were taken, during the last 6 years (Figure 20, Annex 10); concentrations show clear increasing trend.

Figure 17. % of days when MAC_{AD} (AZ) for HF was exceeded in Baku



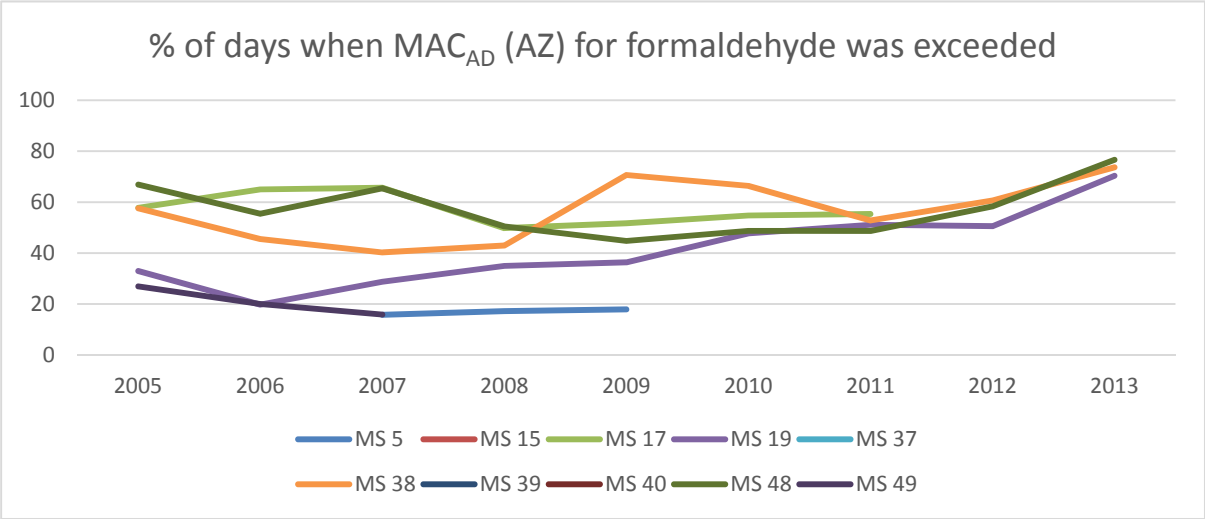
In the rest of the country, HF is being measured in Ganca, Mingachevir, Nakhchivan, and Sumqayit. All measurement data demonstrate that all these cities have high ambient concentrations of HF, clearly exceeding MAC_{AD} most of the time (Figure 21, Annex 11).

Figure 18. % of days when MAC_{AD} (AZ) for HF was exceeded in 4 major cities



Finally, the last air pollutant of concern is formaldehyde, which constantly shows high concentrations throughout air quality monitoring network in Baku. MAC_{AD} (3 μg/m^3) has been exceeded regularly during whole observation period at all monitoring stations, where it has been measured (Figure 19, Annex 12).

Figure 19. % of days when MAC_{AD} (AZ) for formaldehyde was exceeded in Baku



Main emission sources:

Characteristics of emission sources and emissions in Azerbaijan (based on the inventory of industrial sites) are provided in the table below (see table 2) using official statistical data (*source: State Statistical Committee*):

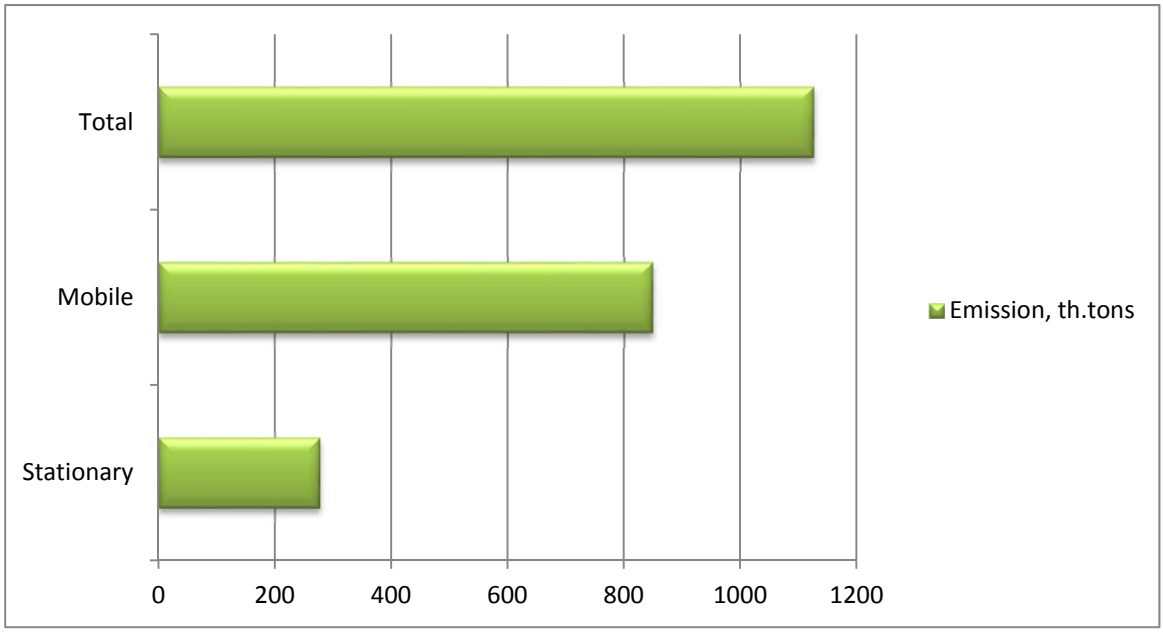
Table 2: Emission sources and total emissions data (thousand tons) for 2010-2012

#	Sources of pollution	2010	2011	2012
1	Number of stationary sources of pollutant emissions into the air-total, units	12486	11665	10829
2	*of which, organized sources*	3816	3751	3310
3	Total amount of pollutants produced by stationary sources, thsd. ton	492	479	317
4	Pollutants captured and treated from stationary sources - total,	277	255	90
5	*in percent to total number of captured pollutants from stationary sources*	56	53	29
6	Air pollutant emissions - total, thousand tons	957	1003	1076
	including:			
7	stationary sources	215	224	227
8	mobile sources	742	779	849

** Difference between numbers of emission from stationary sources in row 3and 7is due to deduction of captured and treated emission.*

As it is seen from the above table, there is 17% increase in total emission from 2010 to 2012 period. By 2012, emissions from mobile sources comprise 75.4% of total emissions. The main finding is that increase in emissions from mobile sources in last 2 years is around 14%, when it is about 5% increase in emissions from stationary sourcesthat are not captured and treated.

Figure 20: Emissions by sources, 2012



According to official statistical data (*source: www.stat.gov.az*) main pollutants forming the stationary sources in the country are divided to solid substances, gas and fluid substances, including sulphur dioxide, carbon oxide and nitrogen oxide.

Table 3: Emission from stationary sources by pollutants 2007-2012

Years	Total pollution	including:				
		Solid substances	gas and fluid substances	from which:		
				sulphurdioxide	carbon oxide	nitrogen dioxide
thousand tons						
2007	385.9	28.4	357.5	9.2	25.3	23.1
2008	295.0	31.3	263.7	7.2	32.0	28.7
2009	300.0	19.8	280.2	4.3	27.6	24.2
2010	214.8	19.3	195.5	2.2	27.2	19.8
2011	224.0	18.0	206	2.7	33.5	21.3
2012	226.5	9.9	216.6	3.3	34.9	23.7

Regards stationary sources by sectors, data is provided in table 4 (*source: State Statistical Committee)*:

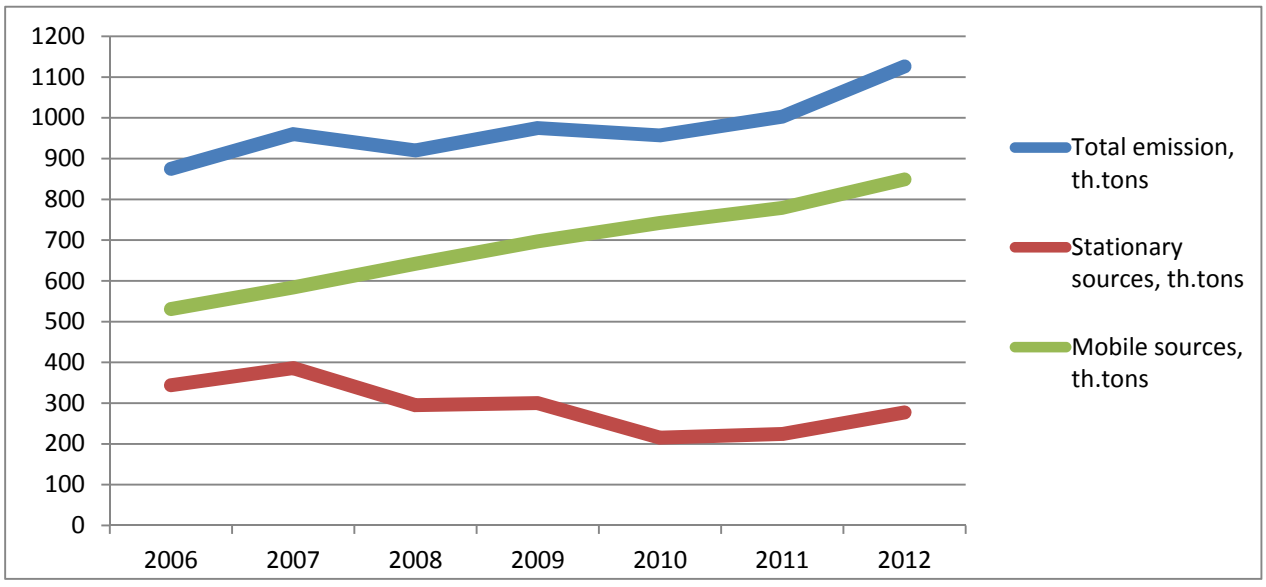
Table 4: Stationary sources by sectors, 2012

Sectors	Air pollutant emissions	including:				
		particulates	gaseous and liquid matters	of which:		
				sulphur dioxide(SO_2)	carbon oxide (CO)	nitrogen dioxide (NO_2)
Total	**226.5**	**9.9**	**216.6**	**3.3**	**34.9**	**23.7**
including:						
Agriculture, fishing and forestry	0.1	0.06	0.06	0.005	0.04	0.008
Mining	87.2	4	83.1	0.7	8.5	7.2
Manufacturing	42.8	4.8	38.0	1.1	1.8	4.5
Production and distribution of electricity, gas and water	39.2	0.3	38.8	1	19.1	11.1
Water supply, treatment of waste water	0.5	0.006	0.5	0.002	0.4	0.05
Construction	5.6	0.5	5.1	0.1	3.2	0.3
Retail and wholesale trade, repair of motor vehicles and motorcycle	1.0	0.01	1.0	0.001	0.09	0.01
Transport, storage and communication	48.8	0.02	48.7	0.09	1.3	0.3
Other branches	1.3	0.2	1.3	0.3	0.5	0.2

As it is shown in the table above, the main stationary source of emission is mining industry.

It should be mentioned that residential sector is not included to the statistic data. This should be indicated as a major problem, as emissions from consumed natural gas (calculated based on gas consumption in residential sector, 2012) in residential sector is 8,5 thousand tons, which is approximately 3% of total stationary emissions.

Figure 21: Total emission in the country by years, 2006-2012



In 2006, total amount of pollutants emitted into the atmosphere from stationary sources was 344 thousand tons. This figure was 226.5 thousand tons in 2012. Such decrease in emission is based on different factors. As it is known, in the past, in oil production associated gas in large quantities was emitted into the atmosphere, and it was included in the statistical emission reports. In 2000 6,29 billion m^3 of gas were produced, from which associated gas was 3,5 billion m^3. In 2012, 97% of associated gas were captured and used.

It should be mentioned that, in the former Soviet Union times most industrial enterprises were not equipped with emission control equipment and those that have such equipment could insure only some 50% of necessary emission reduction. If the whole industrial development period of Azerbaijan can be divided in 3 stages, during the first stage (covering 1960-2000) new established industrial enterprises were ignoring environmental requirements or were not even aware of them, so harmful substances in large quantities were emitted into atmosphere. In 1990, total emission from the stationary sources were reaching 2108,5 thousand tons. This stage could be characterized as recession period due to collapse of former Soviet economic system. In 1990-2000 emissions were decreased by 4,1 times. At this stage obsolete technology and equipment in industrial enterprises, frequent failure of production network, improper use of pollution capturing equipment at the enterprises, disregard of environmental issues by the industries could be mentioned as main causes of air pollution.

The second stage covers period of 2001-2005. Despite of economic revival, production capacity of active enterprises were decreased by 30-35%. As a result from 2000 to 2005 decreasing trend in quantities of air pollution was continuing, relatively stabilising and was in the range of 577 to 558 thousand tons.

The third stage covers period from 2005 to 2012. This stage could be characterized as period of stable economic development. Despite of economic development, the level of emission is decreasing. It is because in this stage many environmentally harmful enterprises were closed and new ones with modern, environmentally friendly technologies established. Many enterprises in the city center of Baku were either closed or moved out of the city. As a result industrial emissions were decreased by 2,5 times.

Another important factor of decrease in emission from stationary sources is changing black oil to gas as fuel at thermal power stations. As it is shown in table 5below, amount of black oil used at thermal power stations has been significantly reduced. It has led to decrease in GHG (CO_2) emissions by around 1 million ton.

***Table 5:** Amount of black oil and gas used at thermal stations from 2006 to 2010.*

Years	Fuel	Amount (thousand tons)	GHG emission (thousand tons)	Total GHG emission (thousand tons)
2006	black oil	1316,0	4184,06	15557,98
	Gas	5222,0	11373,92	
2007	black oil	1063,8	3382,22	14819,52
	Gas	5251,1	11437,30	
2008	black oil	457,8	1455,52	14403,32
	Gas	5944,6	12947,80	
2009	black oil	129,3	411,09	10018,59
	Gas	4411,0	9607,50	
2010	black oil	1,3	4,13	8903,32
	Gas	4085,8	8899,19	

In above table, it was indicated decrease in GHG emissions due to use of gas instead of black oil in thermal stations. Of course, GHG emissions include CO_2 and N_2O pollutants. Decrease in GHG emission means decrease in CO_2 and N_2O emission.

Significant decrease of GHG emission of gas at residential sector is also observed during the last 5 years. It is because of application of gas metering devices (smart cards) at most of residential houses. Almost 90% of residential houses have been provided with metering devices. As a result, total amount of consumed gas in residential sector has been decreased from 3083 million m^3 in 2008 to 2390 million m^3 in 2012 *(source: State Statistical Committee)*. If takes into account increased gasification level (around 90%),significant decrease could be observed due to more economic use of gas by population.

However, in the recent years, rapid increase of a number of road vehicles in the country, mainly in Baku city, raised the amount of harmful gases released into the atmosphere by mobile sources. In 2012, harmful substances emitted into the atmosphere from motor vehicles held 79% of total emissions.

As a main finding, it should be mentioned last years' increase in NO_2 level, especially in Baku city. This means that emission from transport sector should be one of the prior sectors to be considered under national strategy. Exceedances in dust concentration in Baku, Mingachevir and Ganca cities indicate the importance of focusing on these areas as well. Other issue of main importance could be creation of monitoring network enabling to get data on all pollutants relevant to EU standards.

2.2. CURRENT AIR QUALITY POLICIES

International commitments

Azerbaijan has ratified 3international conventions, directly related to protection of air quality: The Convention of Long Range Transboundary Air Pollution, the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer and the United Nations Framework Convention on Climate Change.

i) Convention on Long-Range Transboundary Air Pollution:

Azerbaijan ratified the Convention on Long-range Transboundary Air Pollution in 2002. Ministry of Ecology and Natural Resources is responsible institution for reporting within the convention. MENR has appointed National Focal Point for the Convention and working group was established for the purpose of implementation of works in this sphere. The data on the emissions to the atmosphere over the Republic of Azerbaijan covering the year of 2002 were submitted to the Convention Secretariat.

Pursuant to the order of the President of the Republic of Azerbaijan No1396 on additional measures concerning the issues arising from the international conventions and agreements on the environmental protection, to which the Republic of Azerbaijan acceded, dated 30 March, 2006, it is purported to implement measures on the establishment of observation stations equipped with certain devices for the purpose of improvement of monitoring system of the ambient air, and preparation for ratification of nine protocols of the Convention.

The Working Group is carrying out certain measures in order to prepare for ratification of the following protocols of the Convention - on "Heavy metals", "Persistent Organic Pollutants", "Reduction of acidification, Eutrophication and Ground-level ozone" (Gothenburg Protocol).

Until the ratification of the Convention protocols, the Convention Secretariat and its other agencies shall not require reports and data from the Republic of Azerbaijan, excluding the information on the Protocol concerning the Co-operative Programme (EMEP) for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe.

Because of the lack of inventory of air pollutants due to the shortage of relevant technical capacity at the related agencies, problems appear on the preparation of data on the inventory of air pollutants to the Center on the Cadastres and EMEP for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe.

ii) Convention for the Protection of the Ozone Layer:

Azerbaijan ratified the Vienna Convention for the Protection of the Ozone Layer and its Montreal Protocol on Substances that Deplete the Ozone Layer, including the London and Copenhagen amendments, on 12.06.1996. The ratification of the Montreal Amendment followed in 2000 and on 29 June 2012 its Beijing Amendment has been approved by Presidential decree. MENRis responsible institution for reporting within the convention. National focal point of the convention is representative of the MENR.

As a results of implemented activities, import of substances to Azerbaijan indicated in Annex Aregulated by Montreal protocol has been stopped. A strategy for protection of ozone layer in Azerbaijanwas also prepared.

It has to be noted that Azerbaijan has confirmed the introduction of a ban on the import of controlled substances in Annex A group I (CFCs), in accordance with decision XVI/21, but at the same time thatthe country did not achieve total phase out of these controlled substances by 1 January 2005 in accordance with that decision.

At present time, substances indicated in Annex C mainly HCFC-22 and HCFC-141b (R-22, R-141b) are used in the foaming process. Those substances are not produced in Azerbaijan, only imported. According to the terms of Montreal protocol those substances are imported to Azerbaijan based on the specific procedures. So, first of all, Importer Company applies to the Ministry of Ecology and Natural Resources to get specific license. Only after getting license, the company can pass imported goods through the customs. If there is no license, customs do not allow import of the goods to the country and goods are sent back.

As a partner country of Montreal protocol, Azerbaijan submits annual report to the secretariat on use of substances that deplete ozone layer, as well as on the use of HCFC. When deadline for the submission of the report was 30 September, there was no delay in report submission. After changing this date to 30 of June, it is 2 years that there is delay in submission of the report. It is mainly related to the issue that it is not possible to get reports from the entities by that time. Another important problem is weak institutional capacity. The coordinating organization for reporting is Climate Change and Ozone Center within the Ministry of Ecology and Natural Resources. At present, there is lack of qualified staff and the capacity of current staff is not at desired level. This leads to delay in monitoring procedures, as well to delays in reporting.

iii) UN Framework Convention on Climate Change:

Azerbaijan ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1995. Taking into account the importance of the issue, State Commission on Climate Change has been established in Azerbaijan by the Presidential Decree of 30 April 1997. Composed of leaders of 18 ministries and other governmental institutions, the Commission has been entrusted to coordinate implementation of commitments made under the UNFCCC. Azerbaijan joined Kyoto Protocol in 2000 as a Non-Annex 1 country. MENR is responsible institution of reporting within the convention and has appointed National Focal Point to UNFCCC.

Despite of fact that the country has not taken any qualitative obligation, Azerbaijan has committed to develop, implement and publish national and regional programmes, which would include mitigation measures. One of the other important components in implementing the commitments under UNFCCC is the development and promotion of public awareness on climate change and its consequences, preparation of scientific and technical specialists.

In this regards, Azerbaijan has developed and submitted to the secretariat its First National Communication to UNFCCC in 2000 and Phase 2 report related to technological needs assessment in 2001. Second National Communication was developed and submitted to the secretariat in 2010. Currently, there is on-going project for the preparation of Third Communication which will cover period from 2005 to 2010. Third National Communication is going to be submitted in the beginning of 2015. At the same time, activities for implementation of one of the commitment for preparation of Biennial Update Report for submission to UNFCCC Secretariathave been already started. The report will be prepared and submitted to UNFCCC Secretariat by the end of 2014.

National air quality policy

The reduction of air pollutants has always been one of the priority issues of the Government. Notwithstanding that there is not any specific strategy or action plan related to air quality in Azerbaijan, issues related to air quality improvement have been mentioned in a number of past state programs and action plans.

National Environmental Action Plan (1998-2003) had considered actions to reduce emissions from energy, industry and transport sectors. Actions on improvement of legislative basis on air quality management have been also indicated in the Action Plan. Responsible governmental institutions for implementation of those measures were MENR, Ministry of Transport, Ministry of Industry and Energy. Significant measures have been implemented in legislative basis. For instance, the Law of the Azerbaijan Republic on Protection of Atmospheric Air entered into force on 27 March 2001.

National Program on Environmentally Sustainable Socio-Economic Development adopted in 2002,had included special chapter on action plan, covering period from 2003 to 2010. The considered actions are full transition to the use of unleaded petrol, prohibition of the use of old, incompliant vehicles, introduction of environmentally-friendly passenger transport, expansion of "walking" areas in the cities and improvement of the air quality through expanding of the green areas. The State Committee on Standards, Meteorology and Patents has announced that the country will move to 50 ppm sulphur in fuels by 2015.Some proposed actions have been already implemented, so as since July 2010 it is forbidden to import vehicles not meeting Euro-2 standards. Responsible governmental institutions for implementation of those measures were MENR, Ministry of Transport, Ministry of Industry and Energy.

Issues related to air quality have been also reflected in *Action Plan on improving of ecological conditions in the Republic of Azerbaijan for 2006-2010.* Regards specific issues related to air quality, issues related to the preparation of suggestions on removing of enterprises in coastal zone in Baku city to outside of city, to improve the technical condition of motor vehicles, the adaptation of technical normative for exhaust gases according to European standards (Euro-3), the utilization of motor vehicles out of exploitation, the elimination of traffic jams by balancing the road traffic, preparation of new method on estimation norms of emission (limit values), and so on, should be mentioned. Responsible governmental institutions for implementation of those measures were MENR, Ministry of Economic Development, Ministry of Transport, Ministry of Industry and Energy. It was implemented a number of actions in reducing emissions from transport sector, including measures on the adaptation of technical normative for exhaust gases according to European standards (Euro-3), the utilization of motor vehicles out of exploitation, the elimination of traffic jams by balancing the road traffic. Preparation of new method on estimation norms of emission (limit values) has been implemented by MENR (methodology has been endorsed in 2009 by MENR).

On the other hand, implementation of the *State Programme on Alternative and Renewable Energy Sources (2005-2013)*contributes to the reduction of air pollution, provided that priority is given to non-combustion sources (hydro, wind, solar), as extensive combustion of biomass could lead to a decline in air quality (fine particulates, polycyclic aromatic hydrocarbons). Ministry of Industry and Energy *(recently restructured and renamed to Ministry of Energy)* was main responsible institution for implementation of planned measures. Within the program, the

National Strategy on the Use of Alternative Energy for the period 2012-2020was developed and submitted to Cabinet of Ministers for endorsement, the State Agency on Renewable Energy Sources was established (renamed the State Company on Renewable Energy Sources according to Presidential decree dated 01.06.2012). Main identified targets of the country for the period of 2020 were to achieve 20% share of renewable energy in electricity and 9.7% share of renewable energy in all energy consumption. Along with this, Gobustan Demonstration Station and Training Center was established, work continues on the construction of stations such as "Goychay-1" (3 MW) and "Balakian-1" (1.5 MW). The State Program plans to continue creating a number of large and small hydro-power plants in the country through to 2015, which will lead to reduce of carbon dioxide emissions.

*Action Plan on approximation of legislative basis of Azerbaijan to EU directives (2010-2012)*has also included actions related to improvement of air quality assessment and management. Actions related to air quality were related to 2003/4/EC, 2008/1/EC, 2008/50/EC and 2000/76/EC EU directives. In this regards draft Law on amendments on "The Law on environmental information" was prepared by Ministry of Ecology and Natural Resources and agreed with Ministry of Emergency Cases and Ministry of Justice. At present, the document is under preparation for submitting to Cabinet of Ministers. Besides, draft law on Environmental Impact Assessment was prepared and agreed with relevant organizations. At present, the draft Law is under consideration by National Parliament. Along with this, Ministry of Ecology and Natural Resources has prepared draft amendments to "Law on environmental protection", "Law on air protection", "Law on industrial and household wastes" and "Law on environmental security" and submitted to Ministry of Emergency Cases.

It should be noted that, several actions on the reduction of air pollutants were purported in the concept of *"Azerbaijan 2020: look for the future"* considered the main development concept of Azerbaijan approved on December 29, 2012. In the concept it is stated that: "…*road-protecting green areas will be created to protect roadside areas and the atmosphere and to reduce traffic noises. National standards will be prepared and applied in line with European standards adopted on poisonous substances released into the atmosphere. During the period covered by the concept, it is planned to bring the amount of energy used for the production of one unit of GDP and the amount of carbon dioxide in line with the appropriate indicator of member countries of the Organization for Economic Cooperation and Development, and this is important in terms of implementing the development goals of the millennium*".

At present, *"Action Plan on improvement of ecological situation and efficient use of natural resources in Azerbaijan Republic (2014-2020)*" is under preparation. Action Plan has special chapter on air quality and includes several actions related to improvement of air quality assessment and management. For instance, modernization of technological devices and filters at industrial units, step-by-step shift to Euro-5 standards, provision of special measurement instruments to relevant units dealing with monitoring of emissions to enable to measure quantitative and qualitative indicators of emissions from mobile sources, reduce emissions from production of construction materials, set-up automated network of monitoring stations in big cities, establishment of integrated environmental monitoring laboratories in different regions of the country, establish monitoring network to monitor physical impacts and provision of mobile research laboratories for monitoring network.

Here it should be mentioned that the President of Azerbaijan Republic, in his last speech at the annual meeting of the Cabinet of Ministers devoted to the results of socio-economic results of year 2013, stressed the air pollution problem and importance of improvement of air quality management and entrusted the cabinet of Ministers to develop a certain measures in order to address the problem. In this regards, the Cabinet of Ministers has followed the issue negotiating it with different Ministries and in January 2013 issued a new decision on Euro standards for vehicles. According to recent decision of the Cabinet of Ministers, it is planned to switch to Euro-4 standard for produced and imported vehicles since April of 2014 and application of Euro-4 standards for fuel is going to be launched in coming years.

The Azerbaijani system of environmental laws has largely evolved from Soviet frameworks and practices. The system emphasizes the use of norms along with fees for emissions and fines for exceeding the norms. Azerbaijani environmental law is based on broad legislative enabling or framework acts that describe the environmental aspirations of the government.

Table 6. Air quality management related laws

Year	Law
1995	Constitution of Azerbaijan Republic
1997	Law of the Azerbaijan Republic on Radiation Safety of the Population
1998	Law of the Azerbaijan Republic on Hydro-Meteorology
1998	Law of the Azerbaijan Republic On Industrial and Domestic Wastes
1999	Law of the Azerbaijan Republic on Protection of the Environment
1999	Law of the Azerbaijan Republic on Ecological Safety
2001	Law of the Azerbaijan Republic on Protection of Ambient Air
2002	Law of Azerbaijan Republic on Obtaining of Environmental Information

Like the Law on Protection of the Environment, the Law on Protection of Ambient Air lays out underlying principles as the basis for the law, including emphases on protecting human health, productivity and enjoyment of the atmosphere; prevention of irreversible environmental damages through state regulation; complete, accurate and transparent provision of information on air quality; and the establishment of a systematic scientific approach to protect air quality.

What is most impressive about these broad laws is that they contain the seeds for a sound, progressive, environmental legal system. Taken as a whole the laws recognize a number of important legal and regulatory principles, including:

• The importance of environmental quality for a healthy and productive society;

• The need to address both emissions and discharges of environmental pollution and ambient levels of environmental contamination;

• The importance of maintaining a transparent system of environmental information for the public;

• The importance of avoiding potential conflicts of interest for reviewers of environmental impacts and requests for permissions for emissions/discharges of pollution;

• The importance of adequately funding a government entity for the protection of the environment;

• The "polluter pays" principle;

• The advantages of using economic incentives and market-oriented policy tools to regulate the environmental activities of enterprises; and

• The need for more specific laws to implement the goals of environmental policies.

Efficient implementation of the requirements derived from the Law on ambient air is regulated by a number of regulations issued by the Cabinet of Ministers of Azerbaijan. As an example of such regulations "Regulations on inventory on air pollutants and physical impact sources to pollution", "Regulations on state control on ambient air protection", "Regulations on organization of air protection by juridical persons having chemical, biological and physical sources of pollution", "Regulations on registration of air pollutants and physical impact to pollution", "Regulations on provision of special permission on emission and physical pollution", "Regulations on amount of payment for obtaining special permission and use of it", "Regulations on certification endorsing relevance of fuel, technical devices, technological procedures, engines, transport and other mobile mechanisms to the requirements of air protection", "Hygienic and ecological norms of ambient air and regulations to identify permitted level on physical impact" and "Regulations on state registration of potential hazardous substances for environment and human health, as well harmful substances" could be mentioned.

Main document regulating economic mechanism in ambient air protection is the decision of the Cabinet of Ministers on "Application of fees for use of nature, emission of pollutants and rules of use of the amount collected from those fees" (*Approved by the Decree No.122 of March 3, 1992 of the Cabinet of Ministers (last updated in 1995*)). By this decision the rules of payments for pollution, use of natural resources, as well as principles for use of collected amount from those payments were identified.

Some issues related to air quality management have been also reflected in other Laws such as the Law "On Environmental Protection", the Law "On Hydrometeorologycal Activity", the Law "On Environmental Safety", the Law "On use of Energy resources", the Law "On Energy", the Law "on transport", the Law "On Radioactive safety" and so on.

2.3. SHORT-TERM OBJECTIVES

Objectives under National Strategy on Air Quality Assessment and Management have been identified in close stakeholder consultation and taking into account results of assessment of current situation in air quality legislation, assessment and management system. Objectives have been divided into 2 parts (short-term and long-term objectives) taking into account current possibilities and implementation availability (in terms of available technology, technical capacity) in regards to time-scale.

Basing on the previous analysis and stakeholder consultation, the following short-term air quality objectives for Azerbaijan can be formulated:

1. Recently observed trend of increasing NO_2 concentrations has to be reverted within the next five years (by 31 December 2018) to make sure, that observed NO_2 levels do not exceed peak levels of 2012 throughout the country;

2. Observed daily average SO_2 concentrations at all monitoring sites in Azerbaijan should be maintained well under the national and EU limit values. In Shirvan, Lankaran, and Nakhchivan daily average SO_2 concentrations should not exceed national limit value (50 $\mu g/m^3$) by 31 December 2017.

3. Observed daily average dust (total suspended particles, or TSP) concentrations at all monitoring sites in Azerbaijan should not exceed national limit value (150 $\mu g/m^3$) by 31 December 2018.

4. Observed daily average CO concentrations at all monitoring sites in Azerbaijan should not exceed national limit values by 31 December 2020.

5. Observed daily average HF and formaldehyde concentrations at all monitoring sites in Azerbaijan should not exceed national limit values by 31 December 2017.

⇒ Attainment to these air quality objectives should be accompanied by a number of institutional objectives as follows:

A. Introduction of EU Air Quality Standards and environmental requirements for mobile sources;
B. Improved air quality management;
C. Improved data collection, analysis, storing and reporting;
D. Improved monitoring network covering all EU priority air pollutants;
E. Making air quality monitoring results available to public in real time.
F. Introduction of air pollution dispersion modelling for air quality assessment;
G. Improved inventory of emission sources;
H. Strengthened operator's emission control

2.4. LONG TERM OBJECTIVES

Taking into account Azerbaijan's political decision to adopt EU environmental acquis, in long term-perspective (15-20 years), main objective inthe long term for air quality of Azerbaijan can be formulated as follows:

EU air quality limit values and target values, as stipulated by the Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, should be fully met in the entire territory of the country by 31 December 2030.

3. AIR QUALITY ASSESSMENT AND MANAGEMENT SYSTEM

3.1. AIR QUALITY MONITORING

Overview of the current system

In Azerbaijan, monitoring of pollution of ambient air in Azerbaijan is conducted by the Department of National Environmental Monitoring in accordance with the statute "On the rules of implementation of state monitoring of the environment and natural resources" developed by the Ministry of Ecology and Natural Resources.

Monitoring of pollution of ambient air is regulated by several laws. These are *"Law on ecological security"* (adopted on 08 June 1999), *"Law on protection of ambient air"* (adopted on 27 May 2001), *"Law on protection of human health*" (adopted on 26 June 1997), *"Law on hydrometeorology*" (adopted on 17 April 1998) and by regulation of Cabinet of Ministers on State Monitoring rules of environment and natural resources (adopted on 01 July 2004).

Monitoring and observation of pollution of ambient air is conducted on work days 3 times a day (at 7 am, 1 pm, and 7 pm) at 26 observation stations located in eight big industrial cities of the Republic of Azerbaijan (Baku, Sumgayit, Nakhchivan, Ganja, Mingachevir, Shirvan, Lankaran, Shaki) covering basic polluting ingredients (dust, sulphuric dioxide, nitrogen dioxide and carbon monoxide), and specific harmful substances corresponding to the industrial profile of each city. Stationary and mobile stations are supposed to be established by taking into account the area, landscape, industrial development, mobile pollution sources, and number of population of each (city) settlement.

Observations of concentrations of 18 harmful substances in the atmosphere (dust, sulphur dioxide, soluble sulphates, carbon monoxide, nitrogen dioxide, nitrogen oxide, hydrogen sulphide, soot, solid fluorides, hydrogen fluoride, chlorine, hydrogen chloride, mercury, ammonia, sulphuric acid, formaldehyde, phenols, furfural) are carried out, and their concentrations are determined.

Samples of harmful substances such as dust, soluble sulphates, and sulphuric acid are taken with vacuum cleaner through filter, while other indicators with aspirator via sorption pipes and Richter absorbent receptacles within 20 minutes. Dust is determined with gravimetric method. Sulphur dioxide, nitrogen dioxide, nitrogen oxide, hydrogen sulphide, solid fluoride, hydrogen fluoride, chlorine, ammonia, formaldehyde, furfural are determined with colorimetric method. Soluble sulphates are determined with turbidimetric method. Ambient air phenol is determined with photometric method. Carbon monoxide is determined with electrochemical method. These methods are inherited from former Soviet times. According to decision #147 of Cabinet of Ministers approved in 1997, all norms and methods applied in former Soviet Union stay in force until approval of new norms and methods.

Apart from these indicators meteorological parameters such as pressure (with barometer), temperature and relative humidity (with psychrometer), wind speed and direction (with anemometer) are measured at all stations. These measurements do not have regular character.

At present, the taken samples are analyzed at the laboratory of monitoring of pollution of ambient air of the Center for Monitoring of Environmental Pollution, and handed over the

National Environmental Monitoring Department. These monitoring data are collected in the database by the Division of Calculation of the Center for Computation within the Department.

Regards reporting, the reporting organization for monitoring data is the same Department of National Environmental Monitoring under MENR, which is also responsible for archiving the output of monitoring.

Quality check-up of devices, calculation of calibration coefficients and quality criteria are provided by the State Committee on Standardisation, Meteorology and Patent. Calibration curve is fixed based on indicator identified by tested "Specord 205" spectrophotometer device to provide further analysis. And this calibration curve is different for per indicator according to methodological guideline.

It is provided routine checks during the initial data processing and generation of data including proper data file identification in order to validate monitoring data generated from monitoring stations. Along with this, review of unusual events, field data sheets, and result reportsis ensured. Quality check-up of devices and performance checks are also provided by the State Committee on Standardisation, Meteorology and Patent.

Department of National Environmental Monitoring regularly provides internal consistency tests to identify values in the data that appear atypical when compared to values of the entire data set. This is done along with comparisons of current data with historical data to verify consistency over time.

Monitoring results and prognosis for pollution concentration are included in information bulletins, placed at the official web page of MENR, as well delivered to relevant state organizations and to mass media. According to the order No. 253 of MENR dated 28.11.2012, the daily bulletin on daily concentration of ambient air and natural radiation condition is delivered to different official persons and organizations, including The President of Azerbaijan Republic, Prime Minister, State Councillors, First deputy Prime Minister, Senior State Security Service of Azerbaijan Republic, MENR, Ministry of Emergency Cases, Civil Defence Office of Azerbaijan Republic and Ministry of Health. All information is accessible for units dealing with air quality assessment and management. Generalized data on air quality assessment is accessible for public through internet portals and annual publications.

Recommendations on development and modernization of air quality monitoring system

When assessing current situation in the air monitoring system, it is obviously seen shortcomings in monitoring network, devices used, capacity of staff, as well as list of pollutants that are monitored. Thus, there is a need for improvement of current air monitoring system in regards to modern EU standards.

Main development concept document of Azerbaijan, named as *"Azerbaijan 2020: look for the future"* approved on December 29, 2012 has also underlined protection of atmosphere from pollution as one of the strategic priorities such as preparation and application of national standards on the air pollution in compliance with the European standards. It was also pointed out that, the amount of energy used for an average GDP production and carbon dioxide emission in Azerbaijan during the period of the conception would be approached the certain index on the countries of the Organization for Economic Co-operation and Development.

It should be mentioned that, at present, some issues related to improvement of air monitoring system are going to be considered within*" Action Plan on improvement of ecological situation*

and efficient use of natural resources in Azerbaijan Republic (2014-2020)" that is currently under preparation. Action Plan has special chapter on air quality and includes several actions related to improvement of air quality assessment and management. For instance, planned measures on setting-up automated network of monitoring stations in big cities, establishment of integrated environmental monitoring laboratories in different regions of the country, as well improvement of monitoring network are very important measures related to development of air monitoring system.

Based on provided analyses, the following recommendations are proposed to improve current air quality monitoring system within the strategy on development of air quality assessment and management covering period of 2015-2030:

- ⇒ A1. To revise the air quality standards and harmonize them with those applied in the EU (at least for major pollutants – PM_{10}, $PM_{2.5}$, sulphur dioxide, nitrogen dioxide and nitrogen oxides, carbon monoxide, lead, benzene and ground level ozone) and in later phase, introduce the EU standards for arsenic, cadmium, nickel and polycyclic aromatic hydrocarbons. New air quality standards and emission standards should be in line with EU and WHO air quality guidelines;
- ⇒ A2. To approximate current air legislation to EU directives and upgrade legislative normative base in line with new adopted air quality standards;
- ⇒ A3. In order to facilitate integration of the new air quality standards in line with the EU regulation, enhance capacity of the Air Quality Department and National Monitoring Department of MENR, including staff training, upgrade of technical capabilities and to provide necessary equipment and financial resources;
- ⇒ B1. Establish a working group composed of representatives of institutions responsible for air quality management within MENR, the Centre for Epidemiology and Hygiene of the Ministry of Health, National Academy of Sciences and other related organisation to help coordinating air quality management activities
- ⇒ C1. Develop and regularly update a modern electronic online database containing data from environmental monitoring activities.
- ⇒ D1. To upgrade the air quality monitoring network, especially with automated monitoring stations in big cities in connection with new/revised air quality standards and EU Directive on Cleaner Air for Europe;

Upgrade process of the air quality monitoring network will be periodically done according to development level of the country and the number of monitoring stations will be optimized accordingly.

- ⇒ E1. Improve public access to monitoring data through dissemination of real time information on air pollution situation

3.2. AIR QUALITY MODELLING

Overview of the current system

In Azerbaijan, at present, dispersion modelling is responsibility of Ecological Scientific & Technological Information and Methodology Center (Ecocenter) within MENR. There is no legal regulation or requirement on dispersion modelling.

At present, dispersion modelling is provided on case-to-case basis only at enterprises level. For instance, SOCAR uses dispersion modelling for its enterprises ("Ecolog-2.25" program). There is not any modelling system used for modelling bigger area, for instance Baku city. Limit values for enterprises arecalculated using methodology approved by MENR in 2009.

So far, there exist two different approaches for practical dispersion modelling on air pollution of industrial sources in Azerbaijan. The first approach is developed by Sutton (*OND-86.Qoskomhidromet. Methodology of calculation of concentration of harmful substances to ambient air from industrial entities, 1987*) and used for determining the concentration of the impurity from the source of the formulas obtained on the basis of static. According to Sutton, the distribution of impurities near the point source in different directions is described by Gaussian law. The second approach, developed by Berland (*Source: Berland M.E, Current problems of atmospheric diffusion and pollution, 1975, page 448*) is based on the solution of the turbulent diffusion.

In Azerbaijan, for practical calculations of the pollution concentration field from a point source in the pre-defined weather conditions the "Method of calculating concentrations in the air of harmful substances contained in the plant's emissions" is used, with a unified program for calculation of air pollution UPCAP ECO (UPRZA "ECO" in Russian – Унифицированная программа расчета загрязнения атмосферы УПРЗА «Эколог»). Currently, this program is applied by different enterprises.

It should be mentioned that, background concentration values should be reviewed at least once every five years, with a mandatory adjustment after entering, closing or remodelling major sources of air pollution. For background concentration, it is used methodology approved during former Soviet times by Leningrad (St.Petersburg) Head Geophysical Observatory in 1990. Unfortunately, last calculations on background concentration were made only for the period of 1994-1998.

There is suitable meteorological input data for dispersion modelling in Azerbaijan. During last year's24 automated meteorological stations were installed by the MENR in different regions of the country in order to identify speed and direction of winds, calculate temperature, humidity, temperature of the land surface, atmospheric pressure in a continuous regime. 2 of those stations are located in Baku city (in Pirallahi and Neft Dashlari) and it is planned to install other 2 automated stations in Mashtaga and Cilov settlements. Collected information from automated stations is automatically sent to relevant units of National Hydro Meteorological Department. Apparently, there is no limitation in access to this information for relevant structures of MENR dealing with modelling issues. Regards other organizations doing modelling, it is required to officially apply to MENR for such information and this information is payable based on respective tariff regulations.

Recommendations on improvement of air quality modelling

When analyzing the current situation on air quality modelling, the shortcomings in dispersion modelling emerge as urgent problem. Along with this, there are no emission metadata or a digital map of the pollution indicating emission sources.

Based on provided analysis of current situation on air quality modelling, the following recommendations are proposed to improve current air quality modelling system within the strategy on development of air quality assessment and management covering period of 2015-2030:

- ⇒ F1. To improve air quality modelling structure by restructuring the units within the MENR responsible for dispersion modelling, developing strict regulative norms and guidelines, as well improving technical capacity and providing necessary capacity building to responsible staff;
- ⇒ F2. To introduce advanced air quality assessment methods (e.g. modelling by advanced dispersion models) by application of best international practices in this field;
- ⇒ F3. To elaborate a legal normative base for dispersion modeling, in compliance with EU legislation;
- ⇒ F4. To establish a comprehensive framework for collection and, where necessary, dissemination of metadata or detailed information about the emission sources and environmental conditions, required for development and comprehensive assessment of air pollution dispersion models and mapping of emissions (requirement of CLRTAP reporting), including information on location of emission sources, volumes of emissions, emission dynamics, meteorological conditions and background pollutant concentrations;
- ⇒ F5. To provide necessary technical and financial resources for preparation of digital pollution sources map of Azerbaijan

3.3. EMISSION DATABASES

Overview of the current system

In Azerbaijan, at present, there are emission data for separate entities, for different production sectors and for different cities of the country. Information on sources of pollution is also provided in the reports prepared by the entities. However, these data only exist in paper form, and there are no geospatial metadata – meaning, geographical coordinates of the emission sources are not recorded.

Inventory of emissions from stationary sources is carried out by method of the "Rules of the inventory of hazardous air emissions and sources that have a physical effect," that was approved by the decision number 63 of Cabinet of Ministers of Azerbaijan Republic on April 15, 2002.

During the calculation of emission, instrumental, instrumental-computational and computational methods are used. These are stemming from methodological guidelines for the calculation of emissions from stationary sourcesdeveloped in Soviet times.For instance, for calculations of emission from oil processing sector РД-17-86 methodology is used and for calculation of emission from boilers and thermal power stations methodology of РД-34.02.305-90is used.

Information on emission sources of each entity is described in the following documents:

- Ecological passport for the enterprises dealing with production activities and having pollution sources. Ecological passports are prepared for each entity once per 3 years;
- Maximum allowable concentration limits are calculated for above mentioned enterprises by Ecological Scientific & Technological Information and Methodology Center (Ecocenter) within MENR, as well by relevant consulting companies once per5 years.

All this information is stored at the entities in hard copy, as well at the Environmental Monitoring Department of the MENR.

In Azerbaijan, State Statistical Committee is responsible for collecting and handling data on air emission. Statistical information is collected corresponding to the Law of the Republic of Azerbaijan "On official statistics". The law determines main principles of collecting, storing, analysis, summarizing, spreading and publishing of the information about situation in economic, demography and ecological spheres and its implementation is necessary for all governmental bodies, institutions, establishments, organizations, and also individuals regardless the type of ownership, conformation, location.

The information on emitted into atmosphere harmful substances is collected in State Statistical Committee on the base of two official statistical report forms: these are #2-TG (air) "On protection of ambient air" and #2-TG (air-transport) "On emission of harmful substances into atmosphere from automobile transport" annual official statistical reports. Annual official statistical report form #2-TG (air - transport) "On emitted into ambient air harmful substances from mobile sources" is developed and presented to the State Statistical Committee by the Ecological Scientific & Technological Information and Methodology Center (Ecocenter) within MENR. The report reflects the data on emitted into atmosphere harmful substances from mobile sources by country, and separately by Baki, Shirvan, Ganja, Mingecavir and Sumgayit cities.

Besides this, information on GHG, emitted into atmosphere from stationary sources – carbon dioxide (CO_2), nitric oxide (I) (N_2O), methane (CH_4), hydrofluorocarbons (HFC), sulphur hexafluoride (SF_6), perfluorinatedcarbons (PFC)is collected in the report.

Inventory of emission sources is done by the enterprises and according to the result of a draft inventory MAC limits are developed and statistical report prepared then submitted to Statistical Committee. Official annual statistical report form, filled out by the enterprises is verified by local units of the Ministry of Ecology and Natural Resources and after obtaining required consent (signature) is submitted to statistical bodies at district (city) level, where the enterprises are located, and then to higher body. As a result, comprehensive information of atmospheric pollution is gathered and summarized by Statistical Committee. Generalized information on ambient air (report) is prepared by the Statistical Committee and placed in official web page (www.stat.gov.az/source/environment).

All information is accessible for units dealing with air quality assessment and management. Generalized data on air quality assessment is accessible for public through internet portals and annual publications.

Recommendations

It should be mentioned that current national legislation of Azerbaijan on air quality is not fully consistent with the requirements of EU Directive 2010/75/EU and hence there is no inventory of existing industrial plants by types defined as requiring permit by the Directive. In addition, no assessment of emissions from industrial sources based on the CLRTAP reporting nomenclature (by sectors and subsectors) or according to the EMEP/EEA air pollutant emission inventory guidebook ever been prepared in the country. Currently applied methodologies and emission factors for calculation of emission are not adapted to the EU standards and no analysis on advantages of different methods for emission calculation from stationary or mobile sources has been performed.

Instrumental measurements are not used for calculation of emissions. Emissions are calculated based on amount of used fuel and other materials based on above mentioned methodologies developed in Soviet times.

Most important shortcoming is related to application of obsolete calculation methodologies, most of which is inherited from Soviet period. Out-dated measurement devices, non-existence of automated monitoring stations, lack of capacity of staff increases risks for uncertainty of national emission inventory.

Based on provided analysis on current situation on emission databases, the following recommendations are proposed for the strategy on development of air quality assessment and management covering period of 2015-2030:

- ⇒ G1. To improve institutional structure by establishing new structural unit within MENR dealing with emission inventory and provide its staff with necessary capacity building activities;
- ⇒ G2. To revise outdated methodological guidelines for the calculation of emissions from stationary and mobile sources and adopt new ones using best international practice in this field;
- ⇒ G3. To introduce updated methodology of emission inventories covering also small businesses, households and diffused sources of emissions and advanced methodology of assessment of emissions from mobile sources;
- ⇒ G4. To upgrade current emission reporting system taking into account new applied air quality standards and using online electronic reporting tools and establish electronic emission database with flexible query and automatic report generation features;
- ⇒ H1. Review of the system of administrative sanctions and fines for noncompliance of air pollution limit values with the aim to make it more consistent, proportionate and efficient, which are not limited only to monetary administrative penalties;
- ⇒ H2. Develop detailed rules for environmental monitoring by enterprises using the Guidelines for Strengthening Environmental Monitoring and Reporting by Enterprises in Eastern Europe, Caucasus and Central Asia endorsed at the 2007 "Environment for Europe" Ministerial Conference;
- ⇒ H3. Develop the database accessible to all interested public authorities and the general public.

4. RECOMMENDATIONS ON AIR QUALITY LEGISLATION

Taking into consideration objectives proposed in the strategy, the following significant changes to air quality legislation should be made to be harmonized with European legislation:

⇒ A1. Revise the air quality standards and harmonise them with those applied in the EU

Updating of existing normative acts and elaboration of the new normative acts on air quality standards corresponding with EU Air Quality Standards (Harmonizing with Directive 2008/50/EC on ambient air quality and cleaner air for Europe; The fourth Daughter Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air; Decision 97/101/EC on the exchange of information and data from networks and stations measuring ambient air quality within Member States);

⇒ A4. Establish performance criteria for emissions form mobile sources

Elaboration of new normative acts on emissions from mobile sources(*Harmonizing with Regulation (EC) No 715/2007 of the European Parliament and of the Council of 20 June 2007; Commission Regulation (EC) No 692/2008 of 18 July 2008*)

⇒ B2. Improve economic tools encouraging the reduction of emissions from stationary sources, related to fuel quality and economic tools for motor transport

Making amendments to the Tax Code to improve economic tools encouraging the reduction of emissions from stationary sources, related to fuel quality and economic tools for motor transport

⇒ D2. Develop criteria for monitoring system and reference methods

Making amendments to the Law of the Republic of Azerbaijan "On Air Protection" (#109-IQ, 27.03.2001) on development of the principles of air quality monitoring system, improvement of monitoring network by setting up automated network of monitoring stations, covering all EU priority air pollutants

⇒ F3. Develop modern normative base for air pollution dispersion modelling in line with the EU legislation (

Elaboration of the new normative acts on air pollution dispersion modelling for air quality assessment (Approaching to the Directive2008/50/EC on ambient air quality and cleaner air for Europe)

⇒ H4. Develop emission limit values and emission levels associated with the Best Available Techniques for industrial sectors

Approaching to Directive of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) (Directive 2010/75/EU), updating of existing legal acts and preparation of the new normative acts on emissions from stationary sources, defining emission norms for separate enterprises based on their peculiarity and used technologies

List of legislative acts necessary to amend

i. Law on Environmental Protection #678-IQ, 08/06/1999 *(A1, A4, D2, F3, H4)*

It is necessary to make amendments to this Law on improving state control in the sphere of air quality protection, taking into consideration huge pollution from mobile sources

ii. Law on Air Protection #109-IQ, 27.03.2001 *(A1, A4, D2, F3, H4)*

It is necessary to make amendments to this Law in accordance with harmonization of ambient air quality norms with EU Air Quality Standards; making amendments on development of the principles of air quality monitoring system, improvement of monitoring network by setting up automated network of monitoring stations, covering all EU priority air pollutants;

iii. Tax Code (adopted in 2000*) (B2)*

It is necessary to make amendments to the Tax Code to improve economic tools encouraging the reduction of emissions from stationary sources, related to fuel quality and economic tools for motor transport

iv. "Regulations on state registration of toxic substances emitted to atmospheric air and harmful physical impacts to it" Approved by the Decree No. 112 of July 13, 2002 of the Cabinet of Ministers *(A1, H4)*

These regulations should be seriously changed taking into consideration approach to the Directive 2010/50/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control); The fourth Daughter Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air; Decision 97/101/EC on the exchange of information and data from networks and stations measuring ambient air quality within Member States; list of toxic substances should be updated in accordance with the Directive 2008/50/EC on ambient air quality and cleaner air for Europe.

v. "Regulations on inventory of toxic substances emitted to atmospheric air and its physical impact sources" (Approved by the Decree No.63 of April 15, 2002 of the Cabinet of Ministers *(A1, H4)*

Norms regulating inventory process of emissions should be seriously improved in accordance with Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) and CLTRAP

vi. "Regulations on state control procedure on atmospheric air protection" (Approved by the Decree No.63 of April 15, 2002 of the Cabinet of Ministers) *(A1, A4, D2, F3, H4)*

These regulations should be seriously changed or abolished and new norms on state control procedures on atmospheric air protection should be elaborated including state control on all air pollution sources (approaching to Directive 2008/50/EC on ambient air quality and cleaner air for Europe; Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control)

vii. "Regulations on organization of air protection by legal persons having toxic chemical, biological and physical sources of impacts to atmospheric air" (Approved by the Decree No.63 of April 15, 2002 of the Cabinet of Ministers) (*A1, H4)*

These norms should be abolished and new legislative acts should be elaborated in accordance with principles of EUDirective 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control)

viii. "Regulations on provision of special permission on emission of harmful substances to atmosphere and on harmful physical impacts (Approved by the Decree No. 112 of July 13, 2002 of the Cabinet of Ministers) *(A1, H4)*

These norms should be updated into line with Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control

ix. "Regulations on amount of payment for obtaining special permission on emission of harmful substances to atmosphere and on harmful physical impacts and use of it" (Approved by the Decree No. 112 of July 13, 2002 of the Cabinet of Ministers) *(A1, B2)*

These norms should be abolished and some necessary provisions of these regulations should be amended to the updated "Regulations on provision of special permission on emission of harmful substances to atmosphere and on harmful physical impacts (Approved by the Decree No. 112 of July 13, 2002 of the Cabinet of Ministers)

x. "Regulations on certification endorsing relevance of fuel, technical devices, technological procedures, engines, transport and other mobile mechanisms to the requirements of air protection" (Approved by the Decree No.159 of October 17, 2002) *(A1, A4, H4)*

These regulations should be amended in accordance with principles of EU Legislation Regulation (EC) No 715/2007 of the European Parliament and of the Council of 20 June 2007; Commission Regulation (EC) No 692/2008 of 18 July 2008;Regulation (EC) No 595/2009 of the European Parliament and of the Council of 18 June 2009)

Needs for drafting new legal acts

Along with this, there is a need for drafting new legal acts listed below in order to improve legislative base on air quality assessment and management

i. The Legislative act on approval of the new Air Quality Standards; *(A1, H4)*

ii. The Law on Environmental Impact Assessment ; *(A1, F3, H4)*

iii. The Legislative act on Environmental Monitoring System; (*A1, A4, D2)*

iv. The legislative act on approval of the instruction on the rule of periodical inspecting of emissions from motor vehicles or other movable-mechanical means. *(A1, A4)*

v. The legislative act on approval of the instruction on the list of transportation and other movable-mechanical means polluting ambient air with hazardous substances and on the maximum permissible norms of emission of hazardous substances from these vehicles. *(A1, A4, H4)*

vi. The legislative act on approval of the instruction on the rule of controlling the emission from motor vehicles on the territory of Azerbaijan. *(A1, A4, H4)*

vii. The legislative act on the ratification of CLRTAP Protocols (on "Heavy metals", "Persistent Organic Pollutants", "Reduction of acidification, Eutrophication and Ground-level ozone" (Gothenburg Protocol) and so on) *(A1, H4)*

Roadmap to address legislation to be harmonized with EU:

№	Recommendations	Lead Authority for Implementation	Recommended Timing
List of legislative acts necessary to amend			
1.	Law on Environmental Protection #678-IQ, 08/06/1999	MENR, National Parliament	2016-2018
2.	Law on Air Protection #109-IQ, 27.03.2001	MENR, National Parliament	2016-2018
3.	Tax Code (adopted in 2000*)*	Ministry of Taxes, National Parliament	2016-2018
4.	"Regulations on state registration of toxic substances emitted to atmospheric air and harmful physical impacts to it" Approved by the Decree No. 112 of July 13, 2002 of the Cabinet of Ministers	MENR, Cabinet of Ministries	2018-2022
5.	"Regulations on inventory of toxic substances emitted to atmospheric air and its physical impact sources" (Approved by the Decree No.63 of April 15, 2002 of the Cabinet of Ministers	MENR, Cabinet of Ministries	2018-2022

6.	"Regulations on state control procedure on atmospheric air protection" (Approved by the Decree No.63 of April 15, 2002 of the Cabinet of Ministers)	MENR, Cabinet of Ministries	2018-2022
7.	"Regulations on organization of air protection by legal persons having toxic chemical, biological and physical sources of impacts to atmospheric air" (Approved by the Decree No.63 of April 15, 2002 of the Cabinet of Ministers)	MENR, Cabinet of Ministries	2018-2022
8.	"Regulations on provision of special permission on emission of harmful substances to atmosphere and on harmful physical impacts (Approved by the Decree No. 112 of July 13, 2002 of the Cabinet of Ministers)	MENR, Cabinet of Ministries	2018-2022
9.	"Regulations on amount of payment for obtaining special permission on emission of harmful substances to atmosphere and on harmful physical impacts and use of it" (Approved by the Decree No. 112 of July 13, 2002 of the Cabinet of Ministers)	MENR, Cabinet of Ministries	2018-2022
10.	"Regulations on certification endorsing relevance of fuel, technical devices, technological procedures, engines, transport and other mobile mechanisms to the requirements of air protection" (Approved by the Decree No.159 of October 17, 2002)	MENR, Cabinet of Ministries	2018-2022
Needs for drafting new legal acts			
11	The Legislative act on approval of the new Air Quality Standards	MENR, Cabinet of Ministries	2015-2018
12	The Law on Environmental Impact Assessment	MENR, Cabinet of Ministries, National Parliament	2015-2018
13	The Legislative act on Environmental Monitoring System	MENR, Cabinet of Ministries	2015-2018

14	The legislative act on approval of the instruction on the rule of periodical inspecting of emissions from motor vehicles or other movable-mechanical means.	MENR, Ministry of Transport, Cabinet of Ministries	2018-2020
15	The legislative act on approval of the instruction on the list of transportation and other movable-mechanical means polluting ambient air with hazardous substances and on the maximum permissible norms of emission of hazardous substances from these vehicles	MENR, Ministry of Transport, Cabinet of Ministries	2021-2022
16	The legislative act on approval of the instruction on the rule of controlling the emission from motor vehicles on the territory of Azerbaijan	MENR, Ministry of Transport, Cabinet of Ministries	2020-2024
17	The legislative act on approval of the ratification of CLRTAP Protocols (on "Heavy metals", "Persistent Organic Pollutants", "Reduction of acidification, Eutrophication and Ground-level ozone" (Gothenburg Protocol)	MENR, National Parliament	2020-2025

5. CONCLUSIONS

The comprehensive overview of air pollutants relevant to Azerbaijan, current air quality policy and legislation base, information and analysis on air quality assessment and management system, including air quality monitoring, air quality modelling and emission databases presented in the previous chapters of the strategy document, allow us to conclude that:

- Despite of fact that there is no separate strategy or action plan on air quality management, there is national vision and political will to reduce air pollution in Azerbaijan;
- Current national legislation of Azerbaijan on air quality is not adapted to the requirements of EU Directives and legal framework for air quality management needs to be improved;
- There are shortcomings in air monitoring network, devices used, capacity of staff, as well as list of pollutants that are monitored which leads to conclusion of the need for improvement of current air monitoring network (mostly application of automated stations), monitoring system and standards in regards to modern EU standards and harmonize them with those applied in the EU;
- There is incompliance in data collection and reporting, as well as need for improvement of statistical reporting formats in line with new adopted standards;
- There is a need to improve public access to monitoring data through dissemination of real time information on air pollution situation, especially in Baku city and other big cities;
- Despite of existence of suitable meteorological input data, dispersion modelling is provided on case-to-case level only at enterprises level. Thus, there is a need to improve air quality modelling structure by restructuring the units within the MENR responsible to conduct dispersion modelling, developing strict regulative norms and guidelines, as well improving technical capacity and providing necessary capacity building to responsible staff;
- There is also a need to introduce advanced air quality assessment methods (e.g. modelling by advanced dispersion models) by application of best international practices in this field;
- There is no list of major industrial plants and their evaluation by industry in accordance with the classification of the Directive 2010/75/EU on industrial emissions and the EMEP / EEA Inventory - Emissions 2009;
- Applied methodologies and emission factors for calculation of emission are not adapted to the EU standards and any analysis on advantages of different methods for emission calculation from stationary or mobile sources does not exist;
- Instrumental measurements are not used for calculation of emissions. Emissions are calculated based on amount of used fuel and other materials based on mentioned methodologies;

- Current emission inventory do not cover majority of small business sector and whole residential sector. Thus, there is a need to introduce modernized methodology of emission inventories covering also small businesses, households and diffused sources of emissions and advanced methodology of assessment of emissions from mobile sources;
- Most important shortcoming is related to application ofobsolete calculation methodologies, most of which is inherited from Soviet period. Out-dated measurement devices, non-existence of automated monitoring stations, lack of capacity of staff increases risks for uncertainty of national emission inventory. Thus, there is a need to introduce modernized methodology of emission inventories covering also small businesses, households and diffused sources of emissions and advanced methodology of assessment of emissions from mobile sources;
- Observed shortcoming in access to emission data should be overcome by developing the database accessible to all interested public authorities and the general public.

Above listed conclusions, as well as results of analysis of monitoring data lead to development of the short-term and long term objectives mentioned in above chapters of the report.

6. RECOMMENDATIONS

This draft National Strategy lays down several short-term air quality objectives and a national long-term air quality objective. In addition, institutional objectives along with a set of recommendations for reaching them have been proposed. This chapter summarises the above recommendations and outlines a number of indicators, which can be used for measuring implementation of the strategy.

In the field of *development and modernisation of air quality monitoring system* it is recommended to:

- revise the air quality standards and harmonise them with those applied in the EU (A1);
- approximate current air legislation to EU directives and upgrade legislative normative base in line with new adopted air quality standards (A2);
- build capacity of the Air Quality Department and National Monitoring Department of MENR (A3);
- collect environmental monitoring data into an electronic online data base (C1);
- upgrade monitoring network with automated monitoring stations (D1);
- Improve public access to monitoring data through dissemination of real time information (E1).

In order to measure success of implementation of these recommendations, the following indicators can be applied:

⇒ proportion of environmental monitoring data, available online (%);
⇒ proportion of automated air quality monitoring stations within the national air quality monitoring network (%);
⇒ proportion of air quality monitoring stations, providing real-time monitoring data to the public (%).

Regarding *improvement of air quality modelling* and *development of emission databases*, it was suggested to:

- improve institutional capacity for air pollution dispersion modelling (F1) and for emission inventory (G1);
- introduce advanced air quality assessment methods (F2);
- develop modern normative base for air pollution dispersion modelling in line with the EU legislation (F3);
- establish a comprehensive framework for collection and, where necessary, dissemination of metadata or detailed information about the emission sources and environmental conditions (F4, G4);
- ensure resources sufficient for preparing a digital map of pollution sources in Azerbaijan (F5);
- adopt new guidelines for calculation of the emissions from stationary and mobile sources (G2);
- introduce modernised methodology of emission inventories covering also small businesses, households and diffused sources of emissions and advanced methodology of assessment of emissions from mobile sources (G3);

- review the system of administrative sanctions and fines for noncompliance of air pollution limit values with the aim to make it more consistent, proportionate and efficient (H1);
- develop detailed rules for environmental monitoring by enterprises (H2);
- develop the database accessible to all interested public authorities and the general public (H3).

Success of the above-mentioned recommendations can be measured with the following set of indicators:

⇒ number of licences for advanced air pollution dispersion models, available in Azerbaijan;
⇒ availability of point source emission metadata in electronic form (% from all enterprises, reporting emissions of air pollutants);
⇒ proportion of enterprises, having their emission limit values set available in electronic geo-referenced form (% of all enterprises, obliged to calculate emission limit values);
⇒ proportion of enterprises, carrying out their environmental monitoring in line with the Guidelines for Strengthening Environmental Monitoring and Reporting by Enterprises in Eastern Europe, Caucasus and Central Asia endorsed at the 2007 "Environment for Europe" Ministerial Conference (% of enterprises, carrying out their own environmental monitoring programmes).

Finally, the draft National Strategy recommends significant amendments to the existing legal acts and development of several new ones, all in line with the European air quality management related legislation. It is recommended:

- Revise the air quality standards and harmonise them with those applied in the EU (A1)
- Establish performance criteria for emissions form mobile sources (A4)
- Improve economic tools encouraging the reduction of emissions from stationary sources, related to fuel quality and economic tools for motor transport (B2)
- Develop criteria for monitoring system and reference methods (D2)
- Develop modern normative base for air pollution dispersion modelling in line with the EU legislation (F3)
- Develop emission limit values and emission levels associated with the Best Available Techniques for industrial sectors (H4)

In order to measure success of implementation of these recommendations, the following indicators can be applied:

⇒ Legislative acts on the new air quality standards approved
⇒ Number of the legislative acts on air quality monitoring system
⇒ Conduction of air pollution dispersion modelling based on the new legislation
⇒ Legislation on pollution from industrial sectors approved

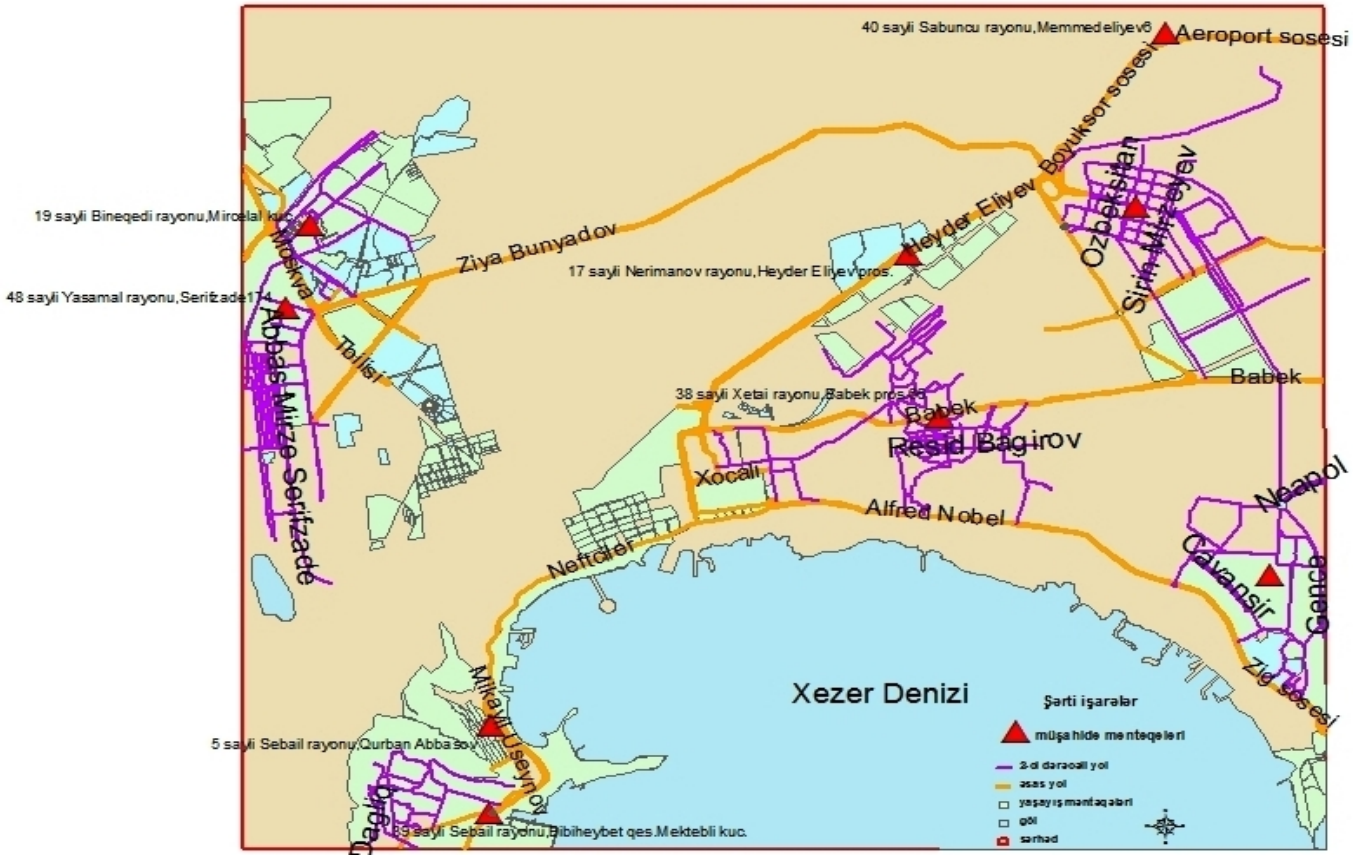
Next steps

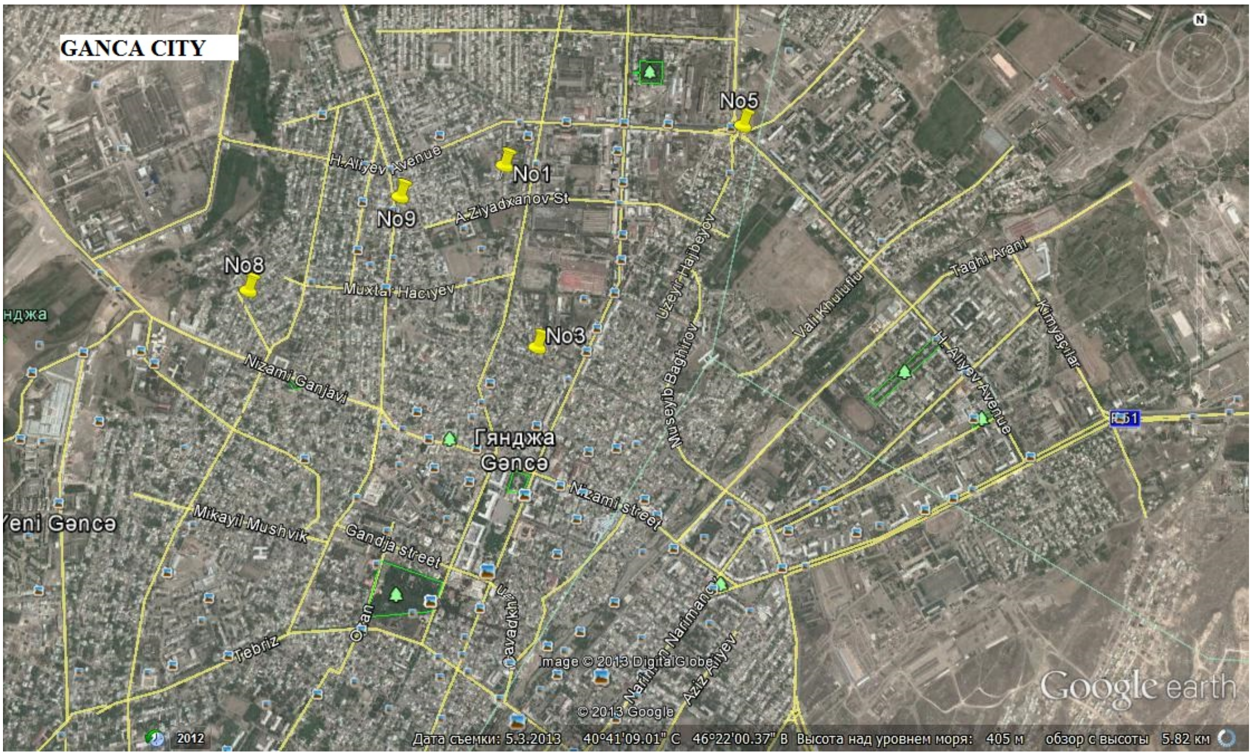
It is obvious that preparation of Strategy on Air Quality Assessment and Management is only the first step. Final revised version of the Strategy Document will be submitted to the MENR for further consideration. Following this, MENR will submit Air Quality Strategy to the Cabinet of Ministers for further actions.

As other important next step, all relevant stakeholders involved to the stakeholder consultation process during preparation of the current strategy should consider proposed recommendations in their sectoral strategies and plans in order to achieve proposed short-term and long-term objectives.

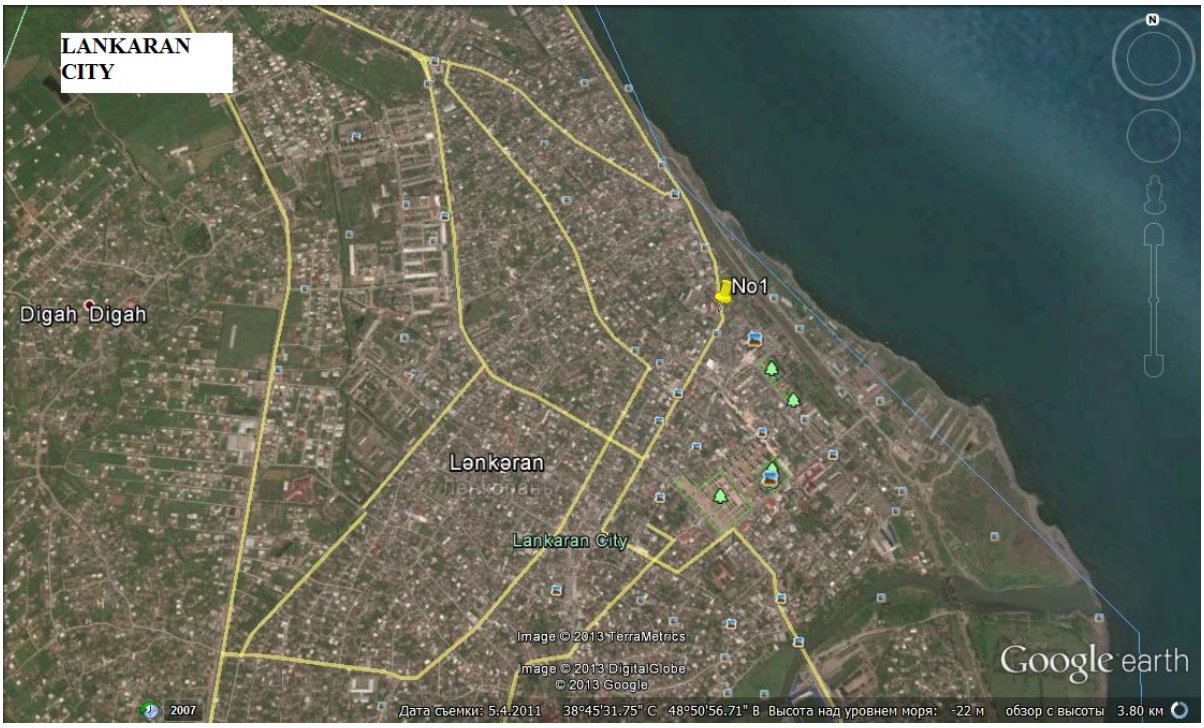
ANNEX 1. MAPS AND GOOGLE VIEW OF MONITORING STATIONS

Baku city




GANCA CITY
No5
No1
No9
No8
No3
H.Aliyev Avenue
A.Ziyadxanov St
Muxtar Haciyev
Nizami Ganjavi
Гянджа
Gəncə
Yeni Gəncə
Mikayil Mushvik
Gandja street
Nizami street
Təbriz
Uzeyir Hajibeyov
Museyib Baghirov
Vali Khuluflu
Taghi Arani
Kimyaçılar
H.Aliyev Avenue
Image © 2013 DigitalGlobe
© 2013 Google
Google earth
2012
Дата съемки: 5.3.2013 40°41'09.01" С 46°22'00.37" В Высота над уровнем моря: 405 м обзор с высоты 5.82 км


Azərbaycan Respublikası ərazisində atmosfer havasının monitorinqi üzrə stasionar müşahidə məntəqələrinin ünvanları(Gəncə şəhəri)
Heyder Eliyev
Mustafa Kamal Ataturk
A.Ziyadxanov
Geray Esedov
Sah Ismayil Xetai
Uzeyir Hacibeyov
Museyib Bagirov
Ferhad Eliyev
H.Haciyev
Ruzigar Qasimov
Israfil Memmedov
Hesen Eliyev
Nizami Gencevi
Cavadxan
Mirze Abbas Abbaszade
Sola Rustaveli
Perviz Semedov
Aga Mirze Ehmedov
Z.Memmedov
Zeynal Xelil
Semed Vurgun
Mehdi Huseynzade
Dadas Bunyadzade
Şərti işarə
müşahidə məntəqələri
yaşıllıq
yaşayış məntəqələri
yol
sərhəd
çay
gölməçə
torpaq sahəsi
fabrik və zavod yerləşən ərazilər
müşahidə məntəqələri
N
W
E
S

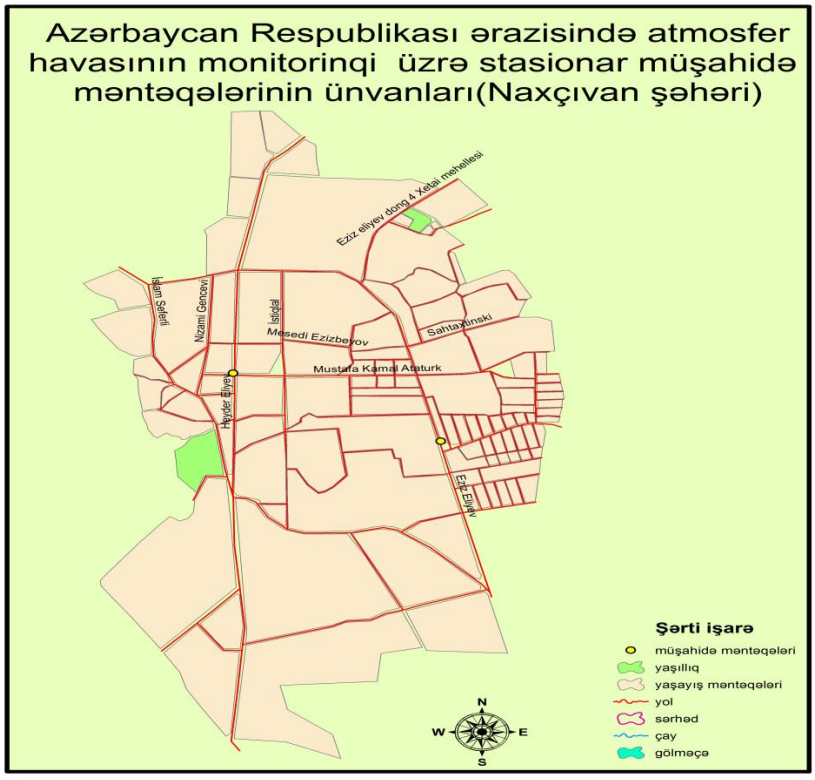

LANKARAN
CITY
Digah Digah
No1
Lənkəran
Lankaran City
Image © 2013 TerraMetrics
Image © 2013 DigitalGlobe
© 2013 Google
Google earth
2007
Дата съемки: 5.4.2011 38°45'31.75" С 48°50'56.71" В Высота над уровнем моря: -22 м обзор с высоты 3.80 км

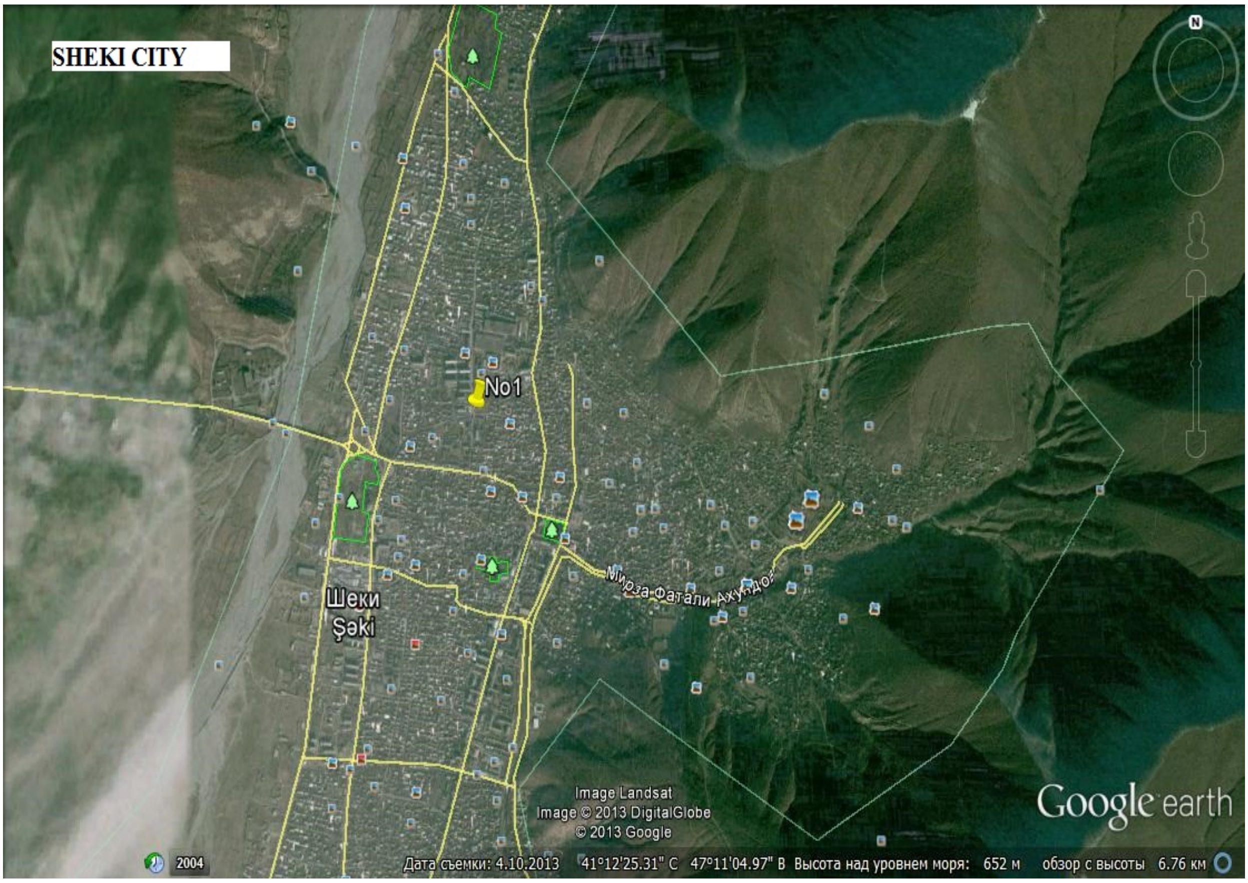

Azərbaycan Respublikası ərazisində atmosfer havasının monitorinqi üzrə stasionar müşahidə məntəqələrinin ünvanları(Lənkəran şəhəri)
Astara - Bakı sosesi
Şərti işarə
müşahidə məntəqələri
yaşıllıq
yaşayış məntəqələri
yol
sərhəd
çay
N
W
E
S

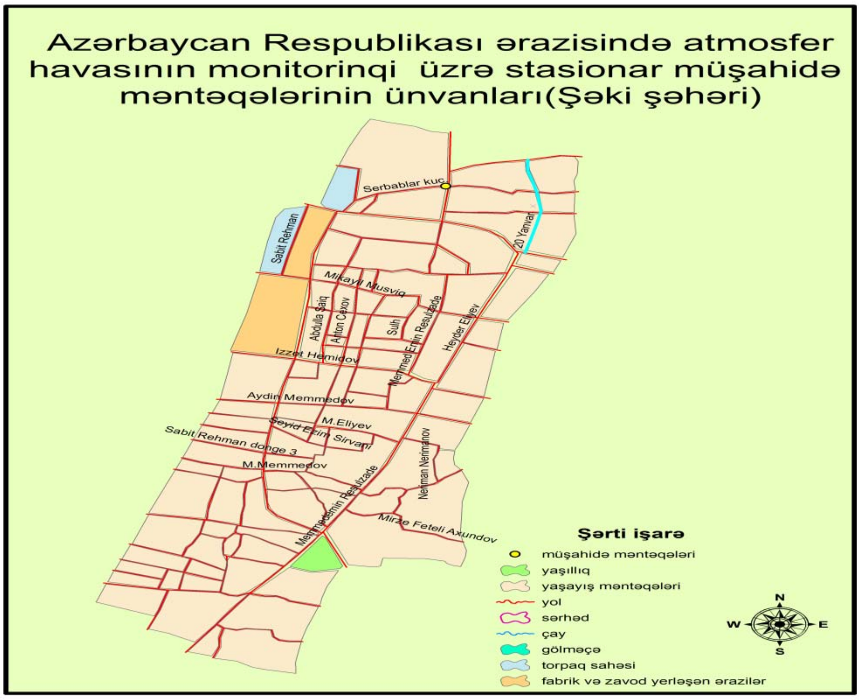

MINGACHEVIR CITY
No4
No3
No1
No2
Мингечаур
Гянджинский проспект
Мингечаурское шоссе
R18
проспект Гейдара Алиева
20 January St
Самух
R17
Image © 2013 DigitalGlobe
© 2013 Google
Google earth
2004
Дата съемки: 4.1.2009 40°45'44.77" С 47°02'54.69" В Высота над уровнем моря: 27 м обзор с высоты 5.45 км


Azərbaycan Respublikası ərazisində atmosfer havasının monitorinqi üzrə stasionar müşahidə məntəqələrinin ünvanları(Mingəçevir şəhəri)
Huseynov küç.
Xocalı küç.
Heydər Əliyev prospekti
Samux
20 Yanvar
Nəriman Nərimanov
Xətai küç.
Sahil yolu
Mingəçevir Varvara yolu
Şərti işarə
müşahidə məntəqələri
yaşıllıq
yaşayış məntəqələri
yol
sərhəd
çay
gölməçə
N
W
E
S


NAKCHIVAN
R49
Алиабад Əliabad
Yarımca
M7
No1
No2
Нахичевань
Hacıvar Nakhchivan
Vaykhir Rd
M8
Heydar Aliyev street
Qaraçuq Карацуг
Şəkərəbad Шекерабад
Yamxana Ямхана
Tumbul Qoşadizə
image © 2013 DigitalGlobe
© 2013 Cnes/Spot Image
© 2013 Google
Google earth
2009
Дата съемки: 5.3.2013 39°11'53.96" С 45°26'53.88" В Высота над уровнем моря: 875 м обзор с высоты 13.74 км

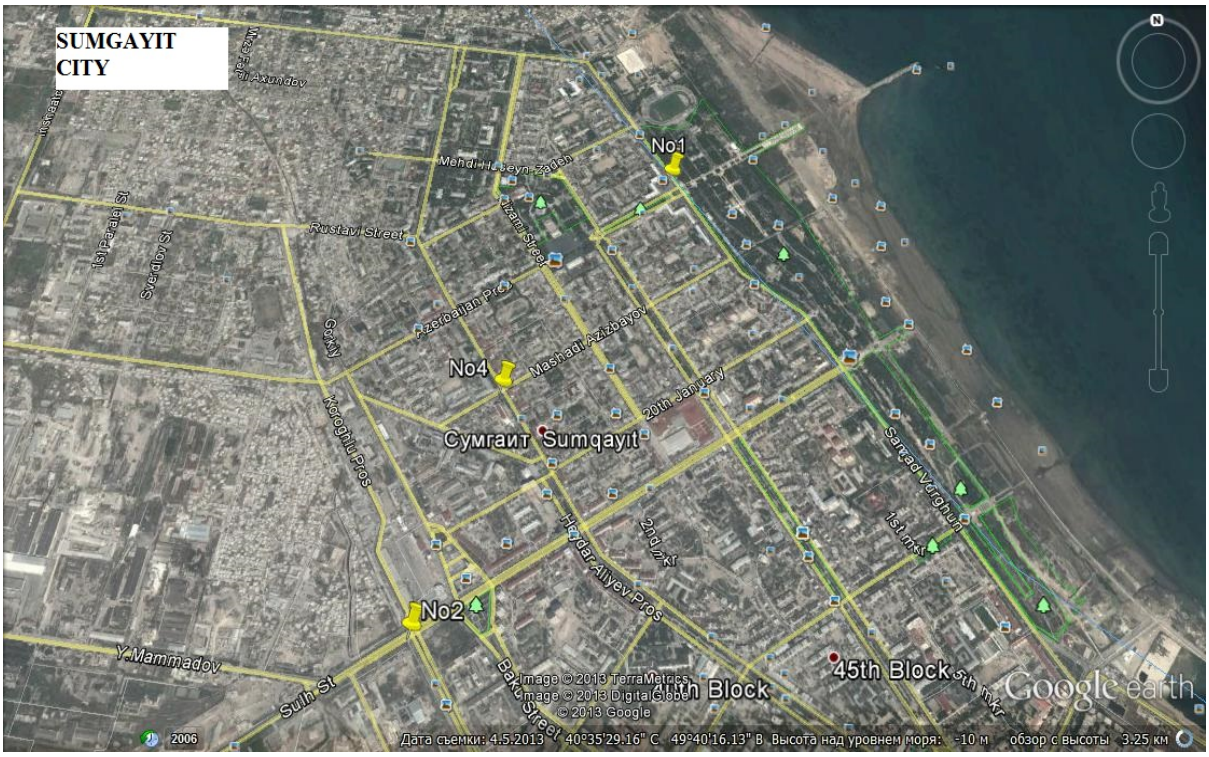

Azərbaycan Respublikası ərazisində atmosfer havasının monitorinqi üzrə stasionar müşahidə məntəqələrinin ünvanları(Naxçıvan şəhəri)
Eziz əliyev dərə 4 Xətai məhəlləsi
Şəhid Şəfəq
Nizami Gəncəvi
İstiqlal
Məsədi Əzizbəyov
Sahibkarlıq
Mustafa Kamal Atatürk
Heydər Əliyev
Ezizbəyov
Şərti işarə
müşahidə məntəqələri
yaşıllıq
yaşayış məntəqələri
yol
sərhəd
çay
gölməçə
N
W
E
S

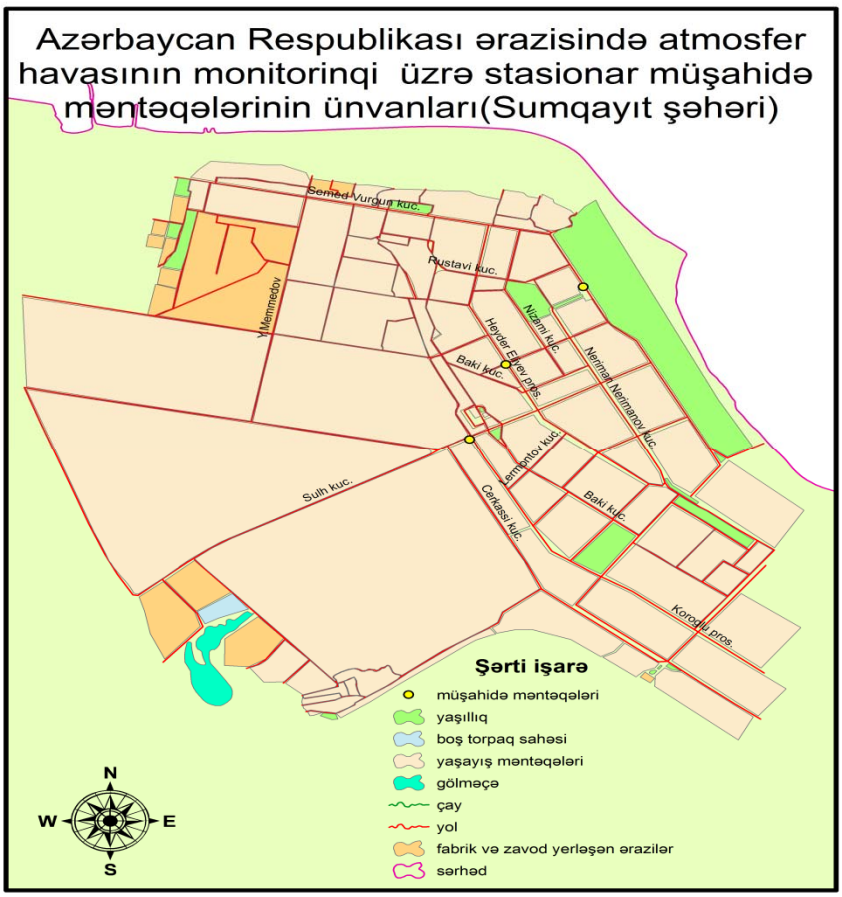

SHEKI CITY
No1
Шеки
Şəki
Image Landsat
Image © 2013 DigitalGlobe
© 2013 Google
Google earth
2004
Дата съемки: 4.10.2013 41°12'25.31" С 47°11'04.97" В Высота над уровнем моря: 652 м обзор с высоты 6.76 км


Azərbaycan Respublikası ərazisində atmosfer havasının monitorinqi üzrə stasionar müşahidə məntəqələrinin ünvanları(Şəki şəhəri)
Şərti işarə
müşahidə məntəqələri
yaşıllıq
yaşayış məntəqələri
yol
sərhəd
çay
gölməçə
torpaq sahəsi
fabrik və zavod yerləşən ərazilər
N
W
E
S


SHIRVAN CITY
M6
R44
R45
Şirvan
Vidadi Street
No1
G.Shakhbalaoglu St
Ширван Şirvan
Ahmadov Ave
Image © 2013 DigitalGlobe
© 2013 Google
Google earth
2004
Дата съемки: 8.29.2013 39°56'59.02" С 48°55'19.65" В Высота над уровнем моря: -24 м обзор с высоты 9.16 км


Azərbaycan Respublikası ərazisində atmosfer havasının monitorinqi üzrə stasionar müşahidə məntəqələrinin ünvanları(Şirvan şəhəri)
Sabirabad yolu
Vidadi kuc.
Elekberov kuc.
Ehmedov kuc.
Vaqif kuc.
Ezizbeyov kuc.
Ezizbeyov kuc.
Şükurov kuc.
Şərin kuc.
Saxbalaoglu kuc.
Eli Bayramov kuc.
28 Aprel kuc.
N
W
E
S
Şərti işarə
müşahidə məntəqələri
yaşıllıq
boş torpaq sahəsi
yaşayış məntəqələri
yol
sərhəd
kanal


SUMGAYIT
CITY
No1
No4
No2
Сумгаит Sumqayit
Rustavi Street
Azerbaijan Pros
Mashadi Azizbayov
20th January
Heydar Aliyev Pros
Y.Mammadov
Sulh St
Baku Street
6th Block
45th Block
Google earth


Azərbaycan Respublikası ərazisində atmosfer havasının monitorinqi üzrə stasionar müşahidə məntəqələrinin ünvanları(Sumqayıt şəhəri)
Səməd Vurğun küc.
Rustavi küc.
Y.Memmedov
Nizami küc.
Heydər Əliyev pros.
Bakı küc.
Nəriman Nərimanov küc.
Lermontov küc.
Sulh küc.
Qafqazı küc.
Bakı küc.
Korolyov pros.
Şərti işarə
müşahidə məntəqələri
yaşıllıq
boş torpaq sahəsi
yaşayış məntəqələri
gölməçə
çay
yol
fabrik və zavod yerləşən ərazilər
sərhəd
N
W
E
S

ANNEX 2-12: ANALYSES OF MONITORING DATA (2005-2013) ATTACHED AS SEPARATE EXCEL FILES