

Contract number: No. 2010 / 232231

# Air Quality Governance in the ENPI East Countries

Feasibility study on the introduction of an Air Quality Monitoring system in Georgia in compliance with EU requirements, including development of the Programme of the National Ambient Air Monitoring System and elaboration of relevant guidelines

*Final Report*

*Date: October 19 2014*



This project is funded  
by the European Union



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## Summary

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**PROJECT TITLE:** Feasibility study on the introduction of an Air Quality Monitoring system in Georgia in compliance with EU requirements, including development of the Programme of the National Ambient Air Monitoring System and elaboration of relevant guidelines

**CONTRACT NUMBER:** No. 2010 / 232231

**COUNTRY:** Georgia

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### IMPLEMENTING ORGANIZATION

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**SIGNATURE**



**DATE OF REPORT:** October 27, 2014

**AUTHOR OF REPORT:** NINO SHAVGULIDZE

**NAME OF KEY EXPERT MONITOR:** Aiga Kala

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## **1. PROJECT SYNOPSIS**

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### **1.1. OVERALL OBJECTIVE**

The overall objective of the project is the development of an improved and sustainable national air quality assessment and management system in Georgia that ensures reduced impacts of air pollution and climate change and increased environmental cooperation and awareness.

### **1.2. RESULTS TO BE ACHIEVED FOR THIS REPORTING PERIOD**

#### ***ACTIVITY 1. THE REVIEW OF AIR QUALITY MONITORING SYSTEMS***

Finalization of a comparative report that will compare state of the art Air Monitoring Networks in the EU with Georgia.

#### ***ACTIVITY 2. PRELIMINARY AIR QUALITY ASSESSMENT***

- **Task 1.** Collect background data and information on air pollution in Georgia
- **Task 2.** Screening study and spatial concentration distribution analysis
- **Task 3.** Develop Preliminary Air Quality Assessment Report

**The output:** Develop Preliminary Assessment of Air Quality in Georgia on urban, regional and national scales.

#### ***ACTIVITY 3. RECOMMENDATIONS FOR AIR QUALITY MONITORING NETWORK FOR TBILISI***

- **Task 1.** Analyses of ADMS-Urban dispersion model results for Tbilisi;
- **Task 2.** Development of an air quality monitoring network design for Tbilisi.

**The output:** Development of an air quality monitoring network design for Tbilisi that will describe the minimum and maximum number of sampling points and their recommended spatial distribution.

#### ***ACTIVITY 4. PROGRAMME OF THE NATIONAL AMBIENT AIR MONITORING SYSTEM IN GEORGIA AND FEASIBILITY STUDY***

- **Task 1.** Draft Programme for the National Ambient Air Monitoring Network in Georgia developed for maximum and minimum scenarios;
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- **Task 2.** Feasibility Study for the implementation of the two scenarios of Ambient Air Quality Monitoring Network (AQMN) in Georgia.

**The output:** Maximum and minimum scenarios for a National Ambient Air Monitoring Network in Georgia have been developed, along with detailed feasibility studies of both scenarios.

## 2. SUMMARY OF PROJECT PROGRESS IN THE REPORTING PERIOD

### 2.1. GENERAL MANAGEMENT ISSUES

### 2.2. PROJECT TEAM FINALIZED ACTIVITIES 2, 3, 4 AND 5.

### 2.3. SPECIFIC ACTIVITIES

#### ACTIVITY 1. THE REVIEW OF AIR QUALITY MONITORING SYSTEMS

The report on “Comparison of the Air Quality Monitoring Systems of EU Members States and Georgia” has been developed in two languages; English and Georgian (please see them attached).

#### ACTIVITY 2. PRELIMINARY AIR QUALITY ASSESSMENT

**Task 1:** Collect background data and information on air pollution in Georgia

The national experts, in cooperation with the Ministry of Environment and Natural Resources Protection, collected background data and information on air pollution in Georgia: types of air pollution sources, causes of pollution, locations of sources, emission characteristics of sources, numbers and types of mobile sources, and meteorological data for regions and cities.

**Task 2:** Screening study and spatial concentration distribution analysis

79 Tube monitors were purchased from Gradko International Ltd to measure NO<sub>2</sub>, O<sub>3</sub> and C<sub>6</sub>H<sub>6</sub> and were deployed in 7 cities of Georgia (please see the table below).

Product	Tbilisi	Rustavi	Zestaphoni	Batumi	Kutaisi	Poti	Chiatura	Quality Control	Monitor Total
NO <sub>2</sub> Tube Monitors	34	7	5	4	4	4	2	3	63
O <sub>3</sub> Tube Monitors	2	1	2	3	2	1	0	1	12

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C <sub>6</sub> H <sub>6</sub> Tube Monitors	0	1	0	1	0	1	0	1	4
City Total	36	9	7	8	6	6	2	5	79

Project team has identified the deployment locations of the tube monitors and indicated them on the maps (maps can be provided upon request). After 2 weeks of deployment the tubes from the indicated locations were sent to “Gradko international” Ltd for analysis. The results regarding passive sampling received from the company are presented below:

City	X and Y Coordinates	Address	Area Description	NO <sub>2</sub> µg/m <sup>3</sup>	Ozone µg/m <sup>3</sup>	Benzene
Batumi	719849; 4612655	14 L. Asatianist.	Kerbside	19.10	93.89	
Batumi	719643; 4614603	Rustavelist. - Nearby the theatre	Suburban	68.20		
Batumi	721691; 4613418	55 Maiakovskist. - Terminal building	Urban background	55.73		0.92
Batumi	721265; 4611580	cable car station	Rural	4.02	87.34	
Chiatura	357662; 4683887	next to the sewing building	Urban background	2.98		
Chiatura	358188; 4682838	Chavchavavdzest.	Suburban	7.54		
Poti	721672; 4672834	Entrance of the city - Kokaia alley	Rural	18.50		
Poti	720285; 4670157	Gegidze St.	Industrial			0.85
Poti	721725; 4668489	Snt. Giorgist. and Kolkhetist.	Suburban	8.97		
Poti	721517; 4666965	The end of baratashvilist.	Rural	3.46	94.62	
Kutaisi	307323; 4681624	Next to the Parliament	Roadside	28.58		0.69
Kutaisi	307139; 4679183	Territory of Cemetery	Rural	1.04	160.99	
Kutaisi	308393; 4680643	Chavchavadze Av.	Kerbside	44.55		
Kutaisi	311924; 4682161	D Nidjaradze I st., #1 Kindergarten	Suburban	5.61	81.79	
Zestafoni	335820; 4663667	Chikashua Laboratory	Suburban	6.51	62.59	

Zestafoni	335802; 4664901	"Saqkabeli"	Industrial	50.19		
Zestafoni	337276; 4663552	Agmashenebelist.	Urban	31.85		
Zestafoni	338321; 4662795	55 Machavarianist.	Suburban	8.68	92.32	
Zestafoni	333006; 4661608	village Kvaliti	Rural	3.41	75.44	
Tbilisi	486584; 4613880	Tbilisi 14	Kerbside	51.72		
Tbilisi	486774 ; 4614183	Tbilisi 29	Kerbside	31.63		
Tbilisi	0482534;1618410	Agmashenebeli St.	Kerbside	38.10		
Tbilisi	0482582;4619181	Tseretelist.	Kerbside	36.15		
Tbilisi	0482982;4618952	Suramist.	Urban background	38.66		
Tbilisi	0482968;4620078	Dadiani St.	Urban background	24.68		
Tbilisi	0481914;4620935	Stanislavski st.	Urban background	31.16		
Tbilisi	0479171;4618706	Budapestist.	Urban background	47.58		
Tbilisi	0481150;4618825	Bakhtrionist.	Urban background	37.04		
Tbilisi	0479171;4618706	Hippodrome	Road side	27.21		
Tbilisi	0479016 ;4619419	VashaPshavela Av.	Road side	27.13		
Tbilisi	0482824;4618209	Agmashenebeli Av.	Road side	59.36		
Tbilisi	0483058; 468041	Tolstonokovist.	Urban background	46.65		
Tbilisi	0481285;4623607	G. Gogiberidzest. Park	Urban background	12.70		
Tbilisi	0479985;4627009	Tavdadebulistr and Petritsist.	Road side	14.53		
Tbilisi	0484569 ;4627018	Gldani district. Mosulishvilist. Park	Kerbside	26.98		
Tbilisi	0485298;4626981	Mosulishvilist. School #79 area	Suburban	33.74		

Tbilisi	0485260;4624823	Temqa district	Urban background	24.50	70.46	
Tbilisi	043678; 4624702	Chargalist.	Urban background	44.84		
Tbilisi	0483280;4624997	Shatilist.	Urban background	22.76		
Tbilisi	0476986;4618521	University - Maglivi building	Urban background	17.69		
Tbilisi	483497; 4615710	Freedom Sq.	Kerbside	59.17		
Tbilisi	483113; 4616166	1st School	Kerbside	42.14		
Tbilisi	482494; 4617004	Rustaveli Av.	Kerbside	94.03		
Tbilisi	482502; 4617274	Leo Kiachelist.	Road side	53.25		
Tbilisi	482161; 4617409	Kostavast.	Road side	80.78		
Tbilisi	480938; 4617301	Abashidzest.	Suburban	51.68		
Tbilisi	480268; 4617690	ZurabArakishvilist.	Urban background	51.16		
Tbilisi	479447; 4616434	Turtle lake	Suburban	9.57		
Tbilisi	481163; 4617828	Mziuri Park	Roadside	29.67		
Tbilisi	481825; 4617435	Melikishvili av.	Urban	70.60		
Tbilisi	494172; 4612152	BesarionChichinadzest.	Suburban	19.19		
Tbilisi	496457; 4615873	Lilo settlement	Suburban	14.37		
Tbilisi	488119; 4615605	DimitriUznadzisst.	Urban background	34.28		
Tbilisi	4876105;4616510	TeopaneDavitianist.	Suburban	28.37		
Rustavi	497954; 4601590	Rustavi 1	Kerbside	14.08		
Rustavi	498474; 4602342	Rustavi 2	Sub urban	14.89		
Rustavi	501619; 4597497	Rustavi 3	Industrial	16.76		
Rustavi	503900; 4595427	Rustavi 5	Industrial	20.32		

<i>Rustavi</i>	<i>504560; 4597282</i>	<i>Rustavi 6</i>	<i>Industrial</i>	<i>17.77</i>		
<i>Rustavi</i>	<i>506989; 4602169</i>	<i>Rustavi 7</i>	<i>Rural</i>	<i>9.34</i>	<i>111.35</i>	<i>4.03</i>
<i>Rustavi</i>	<i>508572; 4598787</i>	<i>Rustavi 4</i>	<i>Industrial</i>	<i>16.76</i>		

All kinds of input data (information about point sources, meteorological data and relief for the 7 cities, transport data and residential emissions) collected by experts were incorporated into the ADMS-Urban model. There were some circumstances during the collection process:

- Transport data: only specific data for Batumi and Tbilisi were available. For other 5 cities such data were not available. Therefore, expected results were generated by comparing data on total vehicles number per person in each of the other cities.
- Residential emissions: It is not possible in Georgia to obtain specific data on residential emissions. Therefore, we calculated natural gas and wood emissions and distributed results based on the population number and their relative densities in each of the cities.

### **Task 3.** Develop Preliminary Air Quality Assessment Report

The results of the modelling and passive sampling campaign, and information from long term monitoring stations and emissions data were drawn together to develop a preliminary air quality assessment report for each of the identified Zones and Agglomerations. A detailed version of the report is contained in Activity 4.

## **ACTIVITY 3. RECOMMENDATIONS FOR AIR QUALITY MONITORING NETWORK FOR TBILISI**

The project team updated the ADMS-Urban model results for Tbilisi, which were prepared by the Cambridge Environmental Research Consultants and CENN in 2013 (data on point sources were updated, as well as updated transport data were included in the model). The report also included an analysis of the passive sampling campaign and long-term monitoring data in Tbilisi.

The second part of the report provided recommendations for the development of air quality network design in Tbilisi. This included an analysis of the type and number of sampling sites in Tbilisi, as well as a methodology and recommendations.

## **ACTIVITY 4. PROGRAMME OF THE NATIONAL AMBIENT AIR MONITORING SYSTEM IN GEORGIA AND FEASIBILITY STUDY**

### **Task 1:** Draft Programme for the National Ambient Air Monitoring Network in Georgia.

A summary of the current air quality in Georgia was outlined, based on activity reports 2 and 3. An assessment of the current air quality monitoring network was also developed. In the report maximum and minimum scenarios were also outlined by comparing the available data against CAFE requirements (for the maximum scenario) and bias adjusted data against the CAFE requirements

(for the minimum scenario). The final section of Task 1 report outlined the technical requirements of the new air quality monitoring network.

**Task 2:** Feasibility Study for the implementation of the two scenarios of Ambient Air Quality Monitoring Network (AQMN) in Georgia.

Task 2 consisted of an in-depth feasibility study of the 2 scenarios. The study outlined technical, managerial and economic implementation issues, as well as the benefits and risks. The technical section focused on the required equipment and potential suppliers, and implemented a SWOT analysis. The economic analysis outlined the potential costs of the two scenarios and implemented a SWOT analysis. The managerial analysis outlined the human capacity of the Ministry of Environment and Natural Resources Protection and a SWOT analysis.

#### **ACTIVITY 5. PREPARATION OF ACTION PLAN AND RECOMMENDATIONS FOR FURTHER IMPROVEMENT OF THE AIR QUALITY ASSESSMENT SYSTEM**

The International Expert developed a summary of the activities implemented in the course of the project. Analysis of the project's feasibility study was also completed.

In the second half of Activity 5 the International Expert developed specific recommendations for the development of the required legislation. This section covered legislative roles, competent authorities, technical and laboratory standards, amendments to existing legislation and a legislation roadmap that would bring Georgian legislation into line with EU Air Quality Directives.

Finally, a meeting was held with the beneficiary to ascertain the preferred scenario, the Maximum Scenario was selected by the beneficiary and chapters on the future course of action and further considerations were developed based on this.

#### **ACTIVITY 6. DISSEMINATION OF PROJECT'S RESULTS**

The project developed an informational leaflet on air quality (Annex 1) with the input of the International Expert. The leaflet covered the benefits of improved air quality and highlighted air quality standards in the United Kingdom. In addition to this, leaflets and brochures from the international air quality governance project were used to dissemination.

Information on the project was distributed via the CENN electronic network (with over 24,000 subscribers), on the CENN website, on the website of the Ministry of Environment and Natural resources Protection and on the website of the Air Quality Governance Project. In addition to this a number of news sources in Georgia reported on the project's development and passive sampling campaign.

A regional seminar was held in Rustavi to raise awareness about the project, disseminate informational materials and explain its goals and achievements.

A final Stakeholder Consultation Group (SCG) meeting was also held in the Ministry of Environment and Natural Resource Protection of Georgia (MoENRP). The SCG meeting involved attendees from

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the MoENRP, the National Environment Agency, and other relevant stakeholders. During the meeting the International Expert provided an overview of the NPP and its findings and recommendations, the attendees raised the following points the meeting:

- The need to involve all relevant ministries in the building of capacity.
- The need to implement the recommendations as quickly as possible, due to the high level of pollution in certain areas of the country.
- The need to focus on heavy metals and organic pollutants, due to the nature of Georgian industries.
- The possible need to expand the proposed network, after passive sampling campaign.

### **3. BUDGETARY ISSUES**

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#### **3.1. FINANCIAL DEVELOPMENTS**

The time-sheets for all activities have been submitted.

### **4. PLANNING FOR THE NEXT REPORTING PERIOD**

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This is the final report submitted for this project.

### **5. OTHER ISSUES**

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Following email correspondence with Noe Megrelishvili, deputy head of the Air Quality Protection Service of the Ministry of Environment and Natural resources Protection, on 13.11.2014, it was agreed that translations would only be provided for Activity Reports 1, 4 and 5. A Translated version of Activity report 1 has already been submitted and translations of Activity Reports 4 and 5 will be completed by December 12, 2014.

### **6. TECHNICAL SUMMARY OF THE PILOT PROJECT**

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#### **6.1. OVERVIEW OF THE ACTIVITIES IMPLEMENTED IN THE COURSE OF THE PILOT PROJECT**

The pilot project “Feasibility study for the implementation of the National Plan for the Development of the Air Quality Monitoring System in Georgia” was delivered by the project team as five separate sequential deliverables. These were:

1. Comparative report (state of the art in the EU, Georgia and other partner countries) and guidelines for designing of National Ambient Air Monitoring Network in compliance with EU requirements,
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2. Preliminary assessment of air quality in Georgia on urban, regional, and national scale,
3. Design of the air quality monitoring network for Tbilisi,
4. Draft National Programme for the Development of the Air Quality Monitoring System in Georgia,
5. Feasibility Study for the Implementation of the National Programme.

## **6.2. ACTIVITY 1.COMPARATIVE REPORT OF CURRENT AIR QUALITY MONITORING SYSTEMS WITH STATE OF THE ART SYSTEM IN THE EU**

This task provided a review of the legal requirements for air quality monitoring systems at the EU level and their practical implementation in two selected EU Member States comparable with Georgia, Greece and Denmark.

Major system gaps in air quality management were identified as follows:

- Underdeveloped systems of air quality monitoring (lack or insufficient number of automatic stations, no measurement of PM<sub>2.5</sub>, very limited measurement of PM<sub>10</sub> and ground level ozone).
- Insufficient air quality data gathering, treatment and interpretation
- Limited access to actual information on air quality

## **6.3. ACTIVITY 2. PRELIMINARY AIR QUALITY ASSESSMENT**

A preliminary air quality assessment was completed which applied the EU air quality directive requirements to the existing data and resources available in Georgia. This involved identifying zones and agglomerations to be designated for air quality purposes and determined the spatial distribution of pollutant concentrations across those zones.

The following data sources were used to assess national air quality and the distribution of pollution across Georgia:

- Monitoring data;
- Spatial concentration distribution of pollutants using modelling techniques;
- Principal pollution sources per region;
- Documentation of assessment methods.

The ADMS-Urban dispersion model was used to provide a city by city distribution of pollutants across Georgia. Input data included a 3 hourly mean data set from 2006 point source emissions data, traffic data from national road schemes, road vehicle emissions factors derived from the UK Emissions factor database and spatial emissions of domestic heating using national fuel consumption records.

## **6.4. ACTIVITY 3. RECOMMENDATIONS FOR AIR QUALITY MONITORING NETWORK FOR TBILISI**

An air quality monitoring network design for Tbilisi was developed during this activity.

The design was based upon the population distribution, a detail emissions inventory for the city, existing ambient monitoring data and on the output from the ADMS-Urban model for Tbilisi.

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The design was directly influenced by the output from the preliminary assessment which identified that pollutants regulated by the CAFE Directive on ambient air quality are likely to exceed LAT (Lower Assessment Threshold), UAT (Upper Assessment Threshold) and LV's (Limit Value) throughout areas of Georgia. The air quality monitoring network design for Tbilisi therefore focused on the likelihood and location of the air quality exceedances in the city of Tbilisi, as this would best identify the most sensitive receptors and relevant sampling locations.

The data used in this study was as follows:

- National Network monitoring measurement data 2008 to 2013
- National Emission Inventory Data for Georgia 2012
- Dispersion modelling of point sources, area sources and mobile sources of air pollutants.
- Short term diffusion tube data

#### **6.5. ACTIVITY 4 - TASK 1. PREPARATION OF THE DRAFT PROGRAMME FOR THE NATIONAL AMBIENT AIR MONITORING NETWORK IN GEORGIA**

A draft programme for the development of a National Ambient Air Monitoring System in Georgia was outlined as part of the Activity 4 – Task 1. The programme explored the minimum number of measuring stations required for both minimum and maximum exposure scenarios. It was proposed to supplement continuous monitoring within the air quality monitoring network with a number of passive sampling measurement sites. This will provide a greater understanding of the distribution of pollutants in both urban areas and in areas where continuous monitoring was not necessary under CAFE directive requirements.

Limiting factors in developing and sustaining the national air quality network were identified as budgets for capital expenditure items, operational costs, the availability of suitable technical skills and a communications infrastructure capable of data telemetry. All of the above would, as a minimum, require 24 months to train and put in place suitably qualified staff.

#### **6.6. ACTIVITY 4 – TASK 2. FEASIBILITY STUDY FOR THE IMPLEMENTATION OF THE TWO SCENARIOS OF AMBIENT AIR QUALITY MONITORING NETWORK (AQMN) IN GEORGIA**

A feasibility study for the two scenarios of an Ambient Air Quality Monitoring Programme in Georgia was completed as part of Activity 4 – Task 2. This involved assessing the technical, management and economic commitments involved in establishing a comprehensive national air quality monitoring network for Georgia.

Major challenges faced by the proposed network will be in identifying a secure for a budget sufficiently large enough to realistically meet all annual operational, calibrations, travel expenses, consumables and laboratory costs. This is second only to the challenge of securing sufficient technical staff with the right skill level and experience for the national network to succeed.

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**The air quality monitoring stations in Tbilisi should be the first to be established and operated, working as a pilot network, from which the national network could then be launched.**

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## **7. RECOMMENDATIONS FOR DEVELOPMENT OF LEGISLATION**

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### **7.1. LEGISLATIVE ROLES**

Central government are required to set overall policy within the context of the EC directives, e.g. incorporate air quality standards into legislation, provide fiscal incentives, delegation of duties or other measures that will assist in implementing air quality objectives.

An air quality process flow chart identifying the sequence of activities and responsibilities involved in implementing the air quality directives has previously been developed<sup>1</sup> and adapted for the air quality sector in Georgia (Figure 2.).

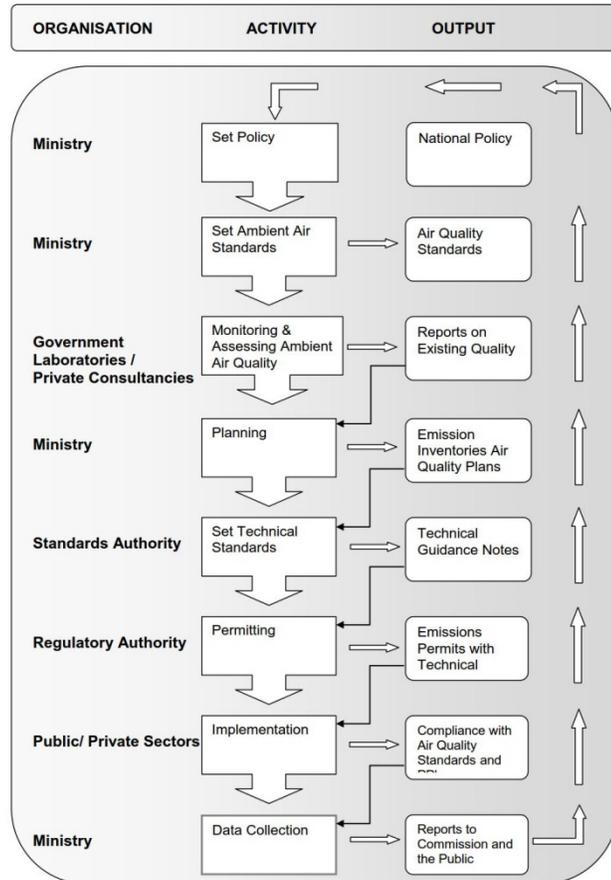
The specific roles of the standards authority and the regulatory authority could typically be combined within the National Environment Agency, involving both planning and data collection. It is not possible to show all the organisational options on a single flow chart, and the actual model adopted will depend upon the existing institutional structures in place.

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<sup>11</sup>Handbook on the Implementation of EC Environmental Legislation Overview. Air Quality

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**Figure 2. Air Quality Process Flow Chart identifying the sequence of activities and responsibilities required to implement the air quality directives**



## 7.2. COMPETENT AUTHORITY

A level of technical expertise already exists within the Ministry of Environmental and Natural Resources Protection Environmental Inspectorate and Air Protection Service. Strategically important roles or specialized technical expertise should also be established at the national level in order to provide a consistent approach and make efficient use of scarce resources. Such roles and expertise include analysing and drafting legal frameworks, national planning and setting standards.

Practical expertise also exists within the National Environmental Agency, though, as previously reported, insufficient resource within the NEA could seriously impact upon the servicing and continuous operation of the air quality monitoring network.

Where appropriate, competent authorities' status can be assigned across several environmental bodies, though drafting of legislation and regulations will always remain a ministry function, other functions such

permitting industrial installations and their emissions to air, could be performed by another competent authority appointed in the air quality sector. These functions will naturally fall under the remit of The Ministry of Environmental and Natural Resources Protection and the National Environmental Agency; however, there may also be a role for local government, beyond traffic management and development planning, particularly in the day to day management of air quality monitoring functions. This could be in partnership with the NEA or by integrating the regional functions of the NEA and local government to harness relevant knowledge established at the local level.

All of the above would be brought together under the umbrella of a national air quality sector strategy, which would carefully consider the relationship between ambient air quality criteria and emission limits from individual sources, regulatory responses and roles. A national monitoring strategy cannot exist in isolation without the acknowledgment of both emissions limits and emissions inventory.

Dispersion modelling links emissions inventories with the concentrations of pollutants in ambient air, allowing the contribution from different sources to existing air pollution levels to be quantified, as well as estimations of the benefits from reducing specific emissions. Statutory revisions or regulatory changes affecting air quality can also be assessed using modelling. Therefore modelling activity should be conducted and reported at a national level, allowing national air pollution priorities to be identified.

### **7.3. NATIONAL REFERENCE LABORATORY AND QUALITY STANDARDS**

An essential obligation in complying with the EU air quality directives is that all measurements are required to be traceable (according to ISO 17025) to a reference standard. There is no existing capability for either of the above as no reference laboratory, accreditation laboratory or routine instrument calibration service exists within Georgia.

A national air quality standard laboratory and/ or delegated private sector resource is required to be established in order to provide a national air quality reference service which meets ISO 17025 traceability criteria. It is the expectation that all monitoring and detection systems can be traced back to a certified national reference standard. The national reference laboratory would be legally responsible for the quality assurance of air pollutant measurements in Georgia as well as the organisation of all national QA/QC programmes and the participation to European QA/QC programmes. It would also validate measurement methods as well as provide 'type approval' of instruments which meet ISO reference method requirements.

### **7.4. ADOPTION OF TECHNICAL STANDARDS FOR AIR QUALITY MONITORING AND ANALYSIS**

National technical standards, which comply with EC directive requirements, must be adopted to provide a uniform approach. Standards need to take account of international best practice and must be upheld through the standards authority.

More stringent standards can be imposed than those contained in the directives, either for different averaging periods or for other additional pollutants. Though in order to do so, scientific advice based on

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knowledge of standards in other countries and health considerations are required which is typically provided by government institutes, scientific advisors or independent consultants.

## **7.5. AMENDMENTS OR INCLUSIONS TO EXISTING GEORGIA AIR QUALITY REGULATIONS**

Subject to the aspiration that Georgia wishes to comply with both the CAFE and the 4th Daughter Directives, a series of model amendments and inclusions have been prepared which set out a regulatory framework upon which Georgia can begin to meet conditions within both Air Quality Directives.

These amendments and inclusions have been referenced against existing Georgia air quality statutory measures and standards (provided in Table 3 below).

Each of the model amendments in Table 3 has a direct reference to the Annex and requirements of both EU CAFE Directive 2008/50/EC and the 4th Daughter Directive 2004/107/EC.

Terms used within the amendments and their inclusions are a reflection of the UK Air Quality Standards Regulations 2012, which has been recognised as an effective transmission of the EU Air Quality Directives into National regulations.

Some or all of the model amendments and inclusions may be already in existence in some form within Georgia statutory measures and standards and may be disregarded, should duplication have occurred.

**Table 3. Model Amendments or inclusions to existing Georgia Regulations meeting allowing Compliance with both CAFE-Directive 2008/50/EC and the 4th Daughter Directive 2004/107/EC**

<i>Legislative Power</i>	<i>Issues regulated/addressed</i>	<i>Model Amendments or inclusions to existing Regulations Compliance with both CAFE-Directive 2008/50/EC and the 4th Daughter Directive 2004/107/EC</i>
<p><i>Law on Environmental Protection, Title VII, Article 26, 27, 27<sup>1</sup></i></p>	<p><b>Title VII contains</b> general provisions on collecting, storing and disseminating environmental information. More specifically:</p> <p>Article 26 defines components and responsible parties for maintaining state environmental registries, natural resources cadastres and spatial information databases. These registries and databases are managed and coordinated by the Ministries of Environment, Agriculture and Health within their own scope of work</p> <p>Article 27 defines the system for ambient environmental quality monitoring and charges The Ministry of Environmental and Natural Resources Protection an Natural Resources Protection with overall coordination of the system</p>	<p><b>Designation of competent authority</b></p> <p>The Ministry of the Environment is designated as the competent authority—</p> <p>(a) for Georgia for the purposes of article 3(f) of Directive 2008/50/EC, and (b) save as set out in paragraph (a), for the purposes of Directive 2008/50/EC and for the purposes of Directive 2004/107/EC.</p> <p><b>Power to give directions</b></p> <p>For the purposes of implementing any obligations of Georgia Directive 2008/50/EC, Directive 2004/107/EC and Council Decision 97/101/EC establishing a reciprocal exchange of information and data from networks and individual stations, measuring ambient air pollution within the member States the Ministry of the Environment has the same power to give directions under these Regulations to:</p>

	<p><i>Article 27<sup>1</sup> tasks the Centre for Environmental Information and Education to collect available environmental information and make it available to the general public</i></p>	<p>— local government authority in Tbilisi;</p> <p><a href="#"><u>— the Governor of Autonomous Republic of Abkhazia and the Governor Autonomous Republic of Adjara</u></a></p> <p><b>Duty in relation to information and alert thresholds</b></p> <p><i>Where any of the information or alert thresholds in Annex XII Directive 2008/50/EC are exceeded the Minister of the Environment must inform the public by means of radio, television, newspapers or the internet.</i></p> <p><i>In zones where the long-term objectives for ozone have been attained, the Minister of the Environment must, insofar as factors including meteorological conditions and the transboundary nature of ozone pollution permit</i></p> <p>— ensure that they continue to be met;</p> <p>— maintain the best ambient air quality compatible with sustainable development;</p> <p>— maintain a high level of protection for the environment and human health.</p> <p><b>Duty in relation to information and alert thresholds</b></p> <p><i>Where any of the information or alert thresholds in Annex XII Directive 2008/50/EC are exceeded the Minister of the Environment must inform the public by means of radio, television, newspapers or the internet.</i></p> <p><i>Duty in relation to critical levels for the protection of vegetation</i></p> <p><i>The Minister of the Environment must ensure that the critical levels set out in Annex XIII Directive 2008/50/EC are not exceeded.</i></p>
<p>Law on Atmospheric Air Protection, Title VII, Article 20, 21;</p>	<p><b>Title VII</b> Title VII contains:</p>	<p><b>Zones and agglomerations</b></p>

*Title XIV, Article 51*

*General provisions on organizing ambient air quality monitoring system, including: i) definition of the ambient air quality system and its components; ii) responsible parties for monitoring; iii) criteria and principles for classification/division of Georgian regions for the purpose of air quality management; iv) various classes/categories of regions in accordance with pollution levels; v) requirements for calculating and reporting pollution indices; vi) responsibilities of state agencies for calculating pollution indices*

*- Provisions on application of the requirements of 2008/50/EC & 2004/107/EC directives for establishing and operating air quality monitoring systems, including: i) requirements for the minimum number, location and operations of monitoring sites/stations and; ii) requirements on measurement methods*

**Title XIV contains:**

*Provisions related to public access and availability of air quality information, including the requirement for ensuring information availability through developing and publishing state of the environment report every three years*

*The Ministry of the Environment must, for the purposes of these Regulations, divide the territory of Georgia into zones and agglomerations.*

*A zone will be classified as an agglomeration if it is a conurbation with a population in excess of 250,000 inhabitants.*

*In these Regulations references to a zone include a zone which has been classified as an agglomeration.*

*Zones are to be identified on a map published by The Ministry of the Environment. (a) Assessment of ambient air quality for SO<sub>2</sub>, NO<sub>2</sub>, NO<sub>x</sub>, PM<sub>2.5/10</sub>, lead, benzene and CO.*

**Assessment thresholds**

*Classify each zone according to whether or not the upper or lower assessment thresholds are exceeded Review the classification of zones at least every five years.*

*When reviewing the classification of zones in accordance with assessment thresholds, it must comply with Section B of Annex II to Directive 2008/50/EC.*

**Assessment criteria**

*The Ministry of the Environment must assess the level of SO<sub>2</sub>, NO<sub>2</sub>, NO<sub>x</sub>, PM<sub>2.5/10</sub>, lead, benzene and CO in ambient air in all zones.*

*In all zones where the level of those pollutants exceeds the upper assessment, fixed measurements must be used, but may be supplemented by modelling or indicative measurements.*

*In all zones where the level of those pollutants is below the lower assessment threshold, modelling or estimation techniques or both may be used instead of measurement.*

*In all other zones a combination of fixed measurements together with modelling or indicative measurements or both may be used.*

*In addition, the Ministry of the Environment must measure PM<sub>2.5</sub> at rural background locations away from significant sources of air pollution.*

*Measurements must be carried out in accordance with the Data Quality and QA procedures set out in Annex I and IV of Directive 2008/50/EC.*

*All measurements must in accordance with reference measurement methods specified in Section A and Section C of Annex VI to Directive 2008/50/EC.*

*Equivalent methods may be used. Where measurements are supplemented by modelling or indicative measurement then the Minister of the Environment must take account of the results of those supplementary methods in assessing ambient air quality for the purposes of these Regulations.*

*“Chemical speciation concentrations” are the concentrations of different chemical components or species of PM<sub>2.5</sub>.*

**Assessment criteria**

*The Ministry of the Environment must assess concentrations of arsenic, cadmium, nickel and benzo(a)pyrene in ambient air in all zones.*

*In zones where the levels of As, Cd, Ni and benzo(a)pyrene are above the upper assessment threshold referred to in section I of Annex to Directive 2004/107/EC, measurement is mandatory but may be supplemented by modelling techniques to provide an adequate level of information on ambient air quality.*

		<p><i>In zones where the levels of those pollutants are between the upper and lower assessment thresholds, measurement is mandatory but may be supplemented by indicative measurements as referred to in Section I of Annex IV to Directive 2004/107/EC or modelling, or both.</i></p> <p><i>In zones where the levels of those pollutants are below the lower assessment thresholds, modelling or objective estimation techniques may be used instead of measurement.</i></p> <p><b>Data quality objectives</b></p> <p><i>When assessing levels of As, Cd, Ni, benzo(a)pyrene, other polycyclic aromatic hydrocarbons or gaseous mercury, The Ministry of the Environment must apply the data quality objectives and other standards contained in Annex IV to Directive 2004/107/EC.</i></p> <p><i>Location and number of sampling points. The location and number of sampling points for the assessment of As, Cd, Ni and benzo(a)pyrene must be determined in accordance with Annex III to Directive 2004/107/EC.</i></p> <p><b>Monitoring of polycyclic aromatic hydrocarbons</b></p> <p><i>The Ministry of the Environment must monitor concentrations of other relevant polycyclic aromatic hydrocarbons in addition to benzo(a)pyrene.</i></p>
<p># 297 Order of the Minister of Labour, Health and Social Protection on Ambient Environment Quality Standards (16/08/01), as amended by #38 (2003) and 350 (2010) orders</p>	<p><i>This regulation contains:</i></p> <p><i>Goals and objectives for Maximum Allowable Concentrations (MACs)</i></p> <ul style="list-style-type: none"> <li>- <i>Responsible agencies for meeting MACs</i></li> <li>- <i>Types of MACs</i></li> <li>- <i>Allowed annual frequencies of one-time maximum concentrations</i></li> </ul>	<p><i>Duties of Ministry of the Environment in relation to limit values etc.</i></p> <p><b>Duty in relation to limit values</b></p> <p><i>The Ministry of the Environment must ensure that levels of sulphur dioxide, nitrogen dioxide, benzene, carbon monoxide, lead and particulate matter do not exceed the limit values set out in part B of Annex XI Directive 2008/50/EC.</i></p> <p><i>In zones where levels of the pollutants are below the limit values set out in set out in part B of Annex XI Directive 2008/50/EC, the Ministry of the Environment must ensure that levels are maintained below those limit values and must endeavour to maintain the best ambient air quality compatible with sustainable development.</i></p> <p><b>Duty in relation to target values</b></p>

	<ul style="list-style-type: none"> <li>- <i>The list of pollutants subject to MACs</i></li>   <li>- <i>MAC values</i></li> </ul>	<p><i>The Ministry of the Environment must ensure that all necessary measures not entailing disproportionate costs are taken to ensure that concentrations of PM<sub>2.5</sub>, ozone, as, Cd, Ni and benzo(a)pyrene do not exceed the target values in Annex I and Part B Annex VII of Directive 2008/50/EC and Annex I of Directive 2004/107/EC.</i></p> <p><i>The Ministry of the Environment must draw up a list of all zones where the target values for As, Cd, Ni or benzo(a)pyrene are met and in relation to those zones, must maintain the levels of those pollutants below those target values and must endeavour to achieve the best ambient air quality compatible with sustainable development.</i></p> <p><i>The Ministry of the Environment must draw up a list of all zones where the target value for As, Cd, Ni or benzo(a)pyrene is exceeded, and in relation to those zones, must identify the areas where those values are exceeded and the relevant sources of pollutants.</i></p> <p><i>In relation to the zones to which where the target value for As, Cd, Ni or benzo(a)pyrene are exceeded, all necessary measures not entailing disproportionate costs are taken must be directed at the predominant sources of emission which have been identified, and where applicable will entail the application of best available techniques in accordance with Directive 2008/1/EC of the European Parliament and of the Council concerning integrated pollution prevention and control.</i></p>
<p><i>Joint Order of the Ministers of Health and Environment on Setting Ambient Air Quality Standards in Accordance with 2008/50/EC and 2004/107/EC Directives</i></p>	<p><i>This regulation will set ambient air quality standards in accordance with EU air directives</i></p>	<p><b>National Exposure Reduction for PM<sub>2.5</sub></b></p> <p><i>Average exposure indicator</i></p> <p><i>The Ministry of the Environment must calculate the average exposure indicator for PM<sub>2.5</sub> ("AEI") for Georgia for 2020.</i></p> <p><i>The AEI must be calculated as follows</i></p> <ul style="list-style-type: none"> <li>— <i>an average annual measurement must be derived from measurements at all the sampling points in urban background locations which have been installed in accordance with Section B of Annex V to Directive 2008/50/EC;</i></li> <li>— <i>the average annual measurement in paragraph (a) must be averaged over three calendar years.</i></li> </ul> <p><i>The AEI for 2020 must be based on measurements for the years 2018, 2019 and 2020.</i></p>

		<p><i>The Ministry of the Environment must ensure that the distribution and number of sampling points used for calculating the AEI adequately reflects the exposure of the general population.</i></p> <p><b>National exposure reduction target</b></p> <p><i>Based on the AEI for 2020, The Ministry of the Environment must establish the national exposure reduction target for the Georgia in accordance with the table in Part B Annex XIV Directive 2008/50/EC.</i></p> <p><b>Duty of The Ministry of the Environment to limit exposure to PM2.5</b></p> <p><i>The Ministry of the Environment must ensure that all necessary measures not entailing disproportionate costs are taken in relation to Georgia with a view to attaining the national exposure reduction target by 2020.</i></p> <p><i>The Ministry of the Environment must base assessment of the compliance of attaining the national exposure reduction target by 2020 on a comparison of the AEI for 2020 with the AEI from the first year of measurements taking place.</i></p> <p><i>The Ministry of the Environment must ensure that all appropriate measures are taken in relation to Georgia with a view to ensuring that the AEI for 2015 does not exceed 20 µg/m<sup>3</sup>.</i></p> <p><i>Where it appears necessary and after consultation with the relevant administrations as appropriate, The Ministry of the Environment must take measures in relation to Georgia to:</i></p> <ul style="list-style-type: none"> <li>— attain the national exposure reduction target;</li> <li>— ensure that the AEI for 2015 does not exceed 20 µg/m<sup>3</sup>.</li> </ul>
<p><i>Order of the Minister of Environment Protection on Setting Rules and Requirements for Minimum Number, Location and Operations of Ambient Air Quality Monitoring Sites as well as for Standard Measurement Methods</i></p>	<p><i>This regulation will set:</i></p> <ul style="list-style-type: none"> <li>- <i>Requirements for defining minimum number and location of monitoring sites</i></li> <li>- <i>Rules for operating monitoring sites/stations</i></li> </ul> <ul style="list-style-type: none"> <li>- <i>Standard measurement methods</i></li> </ul>	<p><b>Ozone Assessment criteria</b></p> <p><i>The Ministry of the Environment must assess the levels of ozone in ambient air in all zones.</i></p> <p><i>The Ministry of the Environment must ensure that fixed measurements are taken in any zone where the concentrations of ozone have exceeded the longterm objectives specified in B of Annex VIII of Directive 2005/50/EC during any of the five years preceding those measurements.</i></p> <p><i>Measurements must be taken in accordance with the reference measurement methods specified in point 8 of Section A of Annex VI to Directive 2008/50/EC.</i></p>

		<p><i>Alternative methods may be used provided the conditions set out in Section B of that Annex are complied with.</i></p> <p><b>Duty in relation to long-term objectives for ozone</b></p> <p><i>The Ministry of the Environment must ensure that all necessary measures not entailing disproportionate cost are taken to attain the long-term objectives for ozone set out in section B of Annex VIII Directive 2005/50/EC.</i></p> <p><i>In zones where the long-term objectives for ozone have been attained, The Ministry of the Environment must, insofar as factors including meteorological conditions and the transboundary nature of ozone pollution permit—</i></p> <ul style="list-style-type: none"> <li><i>— ensure that they continue to be met;</i></li> <li><i>— maintain the best ambient air quality compatible with sustainable development;</i></li> <li><i>— maintain a high level of protection for the environment and human health.</i></li> </ul>
<p><i>Guidelines for Air Pollution Control, RD 52.04.186-89, «Руководство по контролю за загрязнением атмосферы» РД 52.04.186-89; Guidance Documents: РД 52. 04-56-89 and РД 52. 04-57-95</i></p>	<p><i>These documents set out:</i></p> <ul style="list-style-type: none"> <li><i>- Design and operating standards, rules and procedures for air quality monitoring network, including requirements for siting, minimum number and classification of monitoring stations/points</i></li> <li><i>- Principles and methodologies for identifying criteria pollutants</i></li> <li><i>- Sampling and analysis requirements and methods for operations and quality control of laboratory equipment</i></li> <li><i>- Requirements for data collection, analysis, storage and reporting</i></li> </ul>	<p><i>The Ministry of the Environment must install sampling points in accordance with Annex III of Directive 2008/ 50/EC for the assessment of SO<sub>2</sub>, NO<sub>2</sub>, NOx, PM<sub>2.5/10</sub>, lead, benzene and CO.</i></p> <p><i>In zones where fixed measurement is the sole source of information for the assessment of air quality, the number of sampling points must be more than or equal to the minimum number specified in Section A of Annex V to Directive 2008/50/EC for the purpose of assessing compliance with limit values and alert thresholds.</i></p> <p><i>In zones other than agglomerations where fixed measurement is the sole source of information for the assessment of air quality, the number of sampling points must be more than or equal to the minimum number specified in Section C of Annex V to Directive 2008/50/EC for the purpose of assessing compliance with critical levels for the protection of vegetation.</i></p> <p><i>In zones where the information from fixed measurement is supplemented by information from modelling or indicative measurement or both, the number of sampling points in either Section A or C of Annex V, or both, may be reduced by up to 50% provided that the following conditions are met:</i></p> <ul style="list-style-type: none"> <li><i>— supplementary methods provide sufficient information for the assessment of air quality in relation to limit values or alert thresholds,</i></li> </ul>

- *supplementary methods provide sufficient information to inform the public as to the state of ambient air quality, and*
- *number of sampling points to be installed and the spatial resolution of other techniques are sufficient for the concentration of the relevant pollutant to be established in accordance with the data quality objectives specified in Section A of Annex I to Directive 2008/50/EC and enable assessment results to meet the criteria in Section B of the same annex.*

*For the measurement of PM<sub>2.5</sub> in rural background locations, the Minister of the Environment must install a sampling point for every 100,000 km<sup>2</sup>.*

*Location and number of sampling points*

*The Ministry of the Environment must install sampling points in accordance with the criteria set out in Annex VIII to Directive 2008/50/EC.*

*In zones where fixed measurement is the sole source of information for the assessment of air quality, the number of sampling points must be more than or equal to the minimum number specified in Section A of Annex IX to Directive 2008/50/EC.*

*In zones where the concentrations of ozone have been below the long-term objectives for each of the previous five years of measurement, the number of sampling points must be determined in accordance with the criteria set out in Section B of Annex IX to Directive 2008/50/EC.*

*In zones where the information from fixed measurement is supplemented by information from modelling or indicative measurement or both, the number of sampling points may be reduced provided that the following conditions are met:*

— *the supplementary methods provide sufficient information for the assessment of air quality in relation to target values, long-term objectives, information and alert thresholds,*

— *the number of sampling points to be installed and the spatial resolution of supplementary methods are sufficient for the concentration of ozone to be established in accordance with the data quality objectives set out in Section A of Annex I to Directive 2008/50/EC and to enable assessment results to meet the criteria specified in Section B of the same Annex;*

— there is at least one sampling point in each zone, with a minimum of one sampling point per two million inhabitants or one sampling point per 50,000 km<sup>2</sup>, whichever produces the greater number of sampling points; and

— nitrogen dioxide is measured at all remaining sampling points except at rural background stations referred to in Section A of Annex VIII to Directive 2008/50/EC

The Ministry of the Environment must ensure that nitrogen dioxide is measured at no less than 50% of the sampling points required under Section A of Annex IX to Directive 2008/50/EC.

This measurement must be continuous except at rural background locations.

The Ministry of the Environment must ensure that concentrations of the ozone precursor substances listed in Annex X to Directive 2008/50/EC are measured at least one sampling point.

The Minister of the Environment may choose the location and number of sampling points for measurements of ozone precursor substances and must take into account the objectives and methods set out in Annex X to Directive 2008/50/EC.

Arsenic, cadmium, nickel, mercury, benzo(a)pyrene and other polycyclic aromatic hydrocarbons

Assessment thresholds

The Ministry of the Environment must classify each zone according to whether or not the upper and lower assessment thresholds specified in Section I of Annex II to Directive 2004/107/EC are exceeded in relation to arsenic, cadmium, nickel and benzo(a)pyrene. .

## **7.6. ROADMAP FOR GEORGIAN LEGISLATION TO MEET EU AIR QUALITY DIRECTIVES**

The following legislature changes are required for the Georgian ambient air quality monitoring network and assessment method to comply with EU air quality guidelines and Directives:

- Legal harmonization/approximation focusing on directives 2008/50/EC and 2010/75/EU with clear and distinct roles for the competent authority, air quality monitoring, assessments and reporting
  - Determination of air quality species and averaging periods as prescribed by Directives 2008/50/EC and 2010/75/EU
  - Designation of zones and agglomerations for ambient air quality in Georgia
  - Statutory recognition of a National Reference Service Laboratory equipped with certified standards allowing all ambient air quality measurements to be traceable back to a reference standard as required under ISO 17025
-