



INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK



IJPRET-QR CODE

AIR QUALITY MONITORING IN OBILIQ

VEHBI SOFIU, AVNI ALIDEMAJ, KJANI GURI, SADIK LATIFAJ



PAPER-QR CODE

Accepted Date:

06/11/2012

Publish Date:

01/12/2012

Keywords

AIR

Quality

Corresponding Author

Mr. Avni Alidemaj

Abstract

Exploitation monitoring takes on the global proportions. Infiltration process of advanced technology, once on the film screen, provides an expression of expecting environment. Thus, the human imagination is allowed to design the environment in a completely new principles. In addition, practice has shown that the quick and effective solutions are the best for implementation.

Objective: The best way to find the definition of air pollution, along with the analysis of personnel, budget and available equipments, represent a good basis for the final drafting of the problem. Specifying the objectives of monitoring, data quality

objectives along with the selection of appropriate sites, the quality assurance of data, determination and evaluation of the presentation are important elements in this process.

Air quality information in power plants

“Information is Power”. Referring to the famous saying of the information as an individual and society need in order to be informed of any action that directly affects their interests, the following will try to explain the importance of information on issues related to environment.

Nowadays, environment presents a challenge being faced in all over the globe, both in developed and the developing countries, so access to environment information is of particular importance. Referring to data that possesses the Agency on Environmental Protection is that: Kosovo Energy Corporation with the release of poisonous gases exceeds the European allowed norms, “Kosovo A” exceeds these norms 4-6 times, while “Kosovo B” up to 3 times. Until, on the other side, experts on environmental issues declare that pollution caused by “Ferronickle” is more harmful than that of KEK, due to the release of metals with very negative effect to the health of citizens.



Figure 1 Power plants of KEK in Kosovo A, release of gases.

A monitoring plan related to emissions in air (including NO_x, SO_x and particles) from the Power Plants of “Kosovo A” and “Kosovo B” is available, but it’s not being respected mainly due to the limited budget. In both power plants, emissions in air are calculated based on the characteristics of coal and the combustion process parameters (Stein methodology for SO_x and particles).

Thermal Power Plant of “Kosovo B” is equipped with equipments for continuous monitoring of particles; however, the measuring equipments neither are calibrated nor maintained. Monitored values are compared with the calculated values. Thus, the right to be informed about environmental issues, is now widely recognized not only as a legal and

constitutional right which strengthens the role of citizens that being informed to affect on decision making when it's concerning to environment as a vital component of their lives, but suchlike, has a crucial role even in its defense. This legal right is fundamental to the functioning of a democratic system and is regulated by the constitution and national legislation of many countries, as well as with the international conventions and EU directives.

Kosovo is missing the basic environmental data due to lack of monitoring. This process has a high cost and difficult aspect of this is that at this stage of economic development to enable such monitoring. However, without monitoring is difficult to ascertain the sources and levels of pollution, endangered areas, direct and indirect effects of pollution etc, for which will be drawn up programmes and projects for environmental protection.

Air quality monitoring

Today, the Information Systems of Living Environment combine the latest sensors and monitoring technologies with the transfer of data; database development,

statistical models and digital platforms and advanced computer models for processing, distribution and presentation of data and results.

Geographical Information systems (GIS) are an important tool, especially for the presentation of data. An important part of integrated system of air quality management is the establishment of the monitoring programme for air quality. Since the objective of air monitoring programme is well defined, a certain operational sequence has to be followed.

Better definition of possible air pollution problem, together with analysis of personnel, budget and available equipment, present the basis for final compilation. Specifying the monitoring objectives, data of quality objectives along with the selection of appropriate sites, data for quality assurance as well as determination and assessment of presentation are important elements in this process.

Air quality monitoring network

Network design of air quality monitoring essentially involves determination of the number and station, their locations,

monitoring methods toward the objectives, costs and available resources. The typical approach to network design includes the installation of monitoring stations or sampling at selected sites, selected on the basis of the requested and known data. This scientific approach will produce an effective cost of an air quality monitoring programme. Pages must be carefully selected if we want the measured data to be useful.

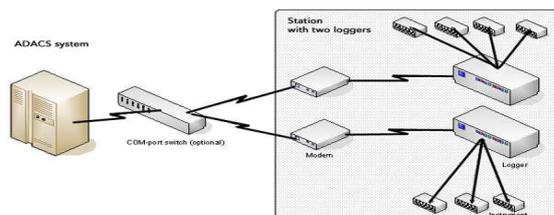


Figure 2 Monitoring of information sources.

The number of sites will depend on the size and topography of the urban area, the complexity of the mixture of resources and again after achieving the monitoring objectives. In Europe, EU directives specify a minimum number of stations that will be created depending on the population, and it also signifies that what type of areas should be monitored.

Information system of air quality, AirQUIS

Information system of air quality, AirQUIS, is a system of computer softwares for air quality management. It's consisted of a database, various numerical models, and a user's graphical inter site. System is directed by Microsoft Windows XP or Windows2000.

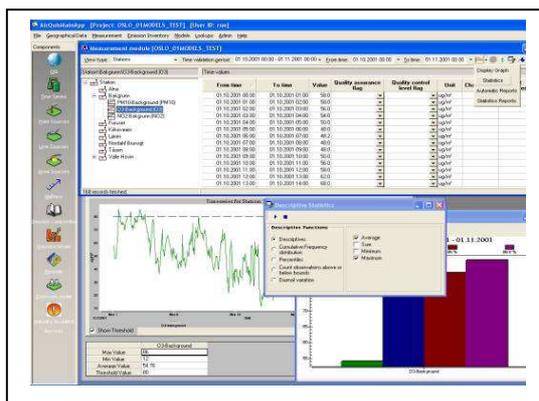
The system provides functionality for collection and statistical evaluation of meteorological data and air quality from monitoring stations, a module that provides a user friendly treatment to an emission data and models for calculation of emissions, wind fields, mixture of pollutants and population exposure. It is possible to perform calculation models automatically, viz, at the scheduled time, as well as manually. This makes AirQUIS a tool for short-term prediction of air pollution and long-term air quality management.

Geographic Information System (GIS) provides an easy access to data and convenient presentation of cartographic data.

Description of air quality information and management system

Typical use of AirQUIS will create a complex

book of information of data (from - megabytes to gigabytes), and scenarios for modeling and configuring the programme by selecting or specifying from several tens to several hundred times the parameters. User will begin calculations of complex models that will be forwarded from several minutes up to several days to a better PC. Results will be obtained in MB, sometimes in GB of additional data to be stored, and users can spend considerable time for interpretation and presentation of results AirQUIS is made as a simple user programme that is forwarded into a PC. The programme can use a single local database or central (network) multi-user database. The motor database is Oracle (version 9,2).



The user's inter site is written in Visual Basic 6 (VB6) and is directed in Microsoft Windows XP or 2000. Computer models were performed in additional module of the

programme (some written in FORTRAN) which also is forwarded into the user's computer. Only function of the database can be served by a node in the network. In a distributed environment, each user has access only to computer power of the local PC, but more PCs can be served simultaneously by a database server.

System operation

Since the AirQUIS contains a wide variety of tools, it's organized into separate modules, is served by graphical user's inter site. AirQUIS contains the following modules:

- Measurement,
- Registration of emissions,
- Modeling,
- Geographical Information System (GIS)



Geographic Information Systems with monitoring technologies

Today, information systems of Living Environment combine the latest sensors and monitoring technologies with the transfer of data; development of database, statistical models and digital platforms and advanced computer models for processing, distribution and presentation of data and results.

Geographic Information Systems (GIS) are an important tool, especially for the presentation of data. An important part of integrated system of air quality management is the establishment of monitoring programme for air quality. Since the objective of air monitoring programme is well defined, a certain order of operations has to be followed.

Better definition of possible air pollution problem, along with analysis of personnel, budget and available equipments, provide the basis to the final draft. Specification of monitoring objectives, data of quality objectives along with the selection of appropriate sites, quality assurance data and determination of presentation are important elements in this process.

The main objectives for the development of air quality measurement and monitoring programme can be to:

- facilitate measurements,
- monitor current levels as a basis for evaluation,
- control air quality in relation to standards or limited values,
- discover the importance of specific resources,
- enable comparison of air quality data from various areas and countries,
- collect data on air quality management, traffic and land use for planning purposes,
- observe trends (related to emissions),
- reduce the strategy development,
- determine exposure and assess the effects of air pollution on health, vegetation or
- construction materials,
- inform the public about the air quality and raise awareness,
- develop warning systems for air prevention pollution,
- facilitate the distribution resources and identification,
- supply data for exploratory research,

- develop/evaluate management tools,
- develop and test the analytical instruments and
- support legislation relating to air quality limited by values and guidelines.

Some of the sources of emissions (pollutants) that have an impact on the living environment

Air and pollution sources

The major sources of polluting emissions are:

- Stationery industrial sources: usually concentrated in industrial areas and densely populated settlements;
- Traffic;
- Construction areas, quarries, cements, etc;
- Thermal power plants;
- Large combustion sources, etc.
- Emission of greenhouse gases (eg. CO₂, CH₄, NO_x, etc.);
- Emission of toxic gases and their emission in the area, such as CO, N₂O, SO_x etc.

So the greatest air pollution comes as a result of energy production (due to the fact that about 98% of obtained energy is from combustion of coal), transport (due to the fact that most of the vehicles are very old, as well as due to poor quality of fuels), mineral extraction, industrial production etc. Air quality is not a concerned problem in all areas of the country. In this respect more problematic are developed urban areas, around the thermal power plants, due to the impact of plants “Kosovo A”, “Kosovo B” and vehicles, then Mitrovica, as a result of industrial waste in the compound of “Trepca, Drenas due to operations of “Ferronickel”, “Hani i Elezit” due to the products of “SharrCement” as well as the other industrial operators, including quarries, etc.

There is little available information about the number of motor vehicles per km of road network, the types of vehicles and the main form of heating systems, thus making it difficult to forecast the real impact of this type of emissions on air quality in this area.

Vehicles in Kosovo are generally old, in emission class from Euro 1 to Euro 3.

Consequently, specific emission level should be high enough. However, the impact of traffic emissions on air quality in the area of interest must be ignorable: most of the traffic is concentrated in Pristina, more than 3 km away from the boundary of the development area of interest and traffic emissions affect air quality around 500 m from the emission sources.

As pollutant emissions are: Nox, CO₂, SOx, soot, dust, smoke, etc. It is necessary to know the value of polluting emission monitoring to determine the extent of environmental pollution.

Monitoring, processing and dissemination of information

It is very essential that environmental data to be collected and properly managed, so that the conclusions and recommendations which will be drawn, to serve as a good basis for determining future environmental policies and undertaking measures on prevention and environmental control.

The database must be organized and maintained; integration of monitoring, data collection, storage and primary processing of environmental data.

To be responsible for good quality data processing, since the monitored samples during analysis up to the final data. Information and data collected in SIM form the basis for deriving recommendations, environmental development policies, strategies, reports, action plans and programmes. This forms the basis for decision making in a certain organization.

Beside these, should be develop a web site where the various public and institutions can be supplied with information, at the same time a database should be established. The database will contain more notes and they will be more detailed.

Conclusions: At the moment, the world mostly covers its energy needs by non-renewable energy sources, mostly fossil fuels – coal, oil and natural gas. As the name suggests, these energy sources are not renewable, and that implies that they cannot last forever and that in one moment they will be spent. Fossil fuels are very harmful to the environment due to the emission of the large amount of carbon dioxide (CO₂), environmental pollution in the form of oil spills at sea, causing smog that is very harmful to health. At the

moment, perhaps the most stressed negative effect of fossil fuels is *global warming* – perhaps the greatest challenge which the mankind has encountered in its short history. When there is no water, there is not quality life, such as in deserts. Climate changes on Earth have reached such a level that we can speak about climate crisis.

Vision of exiting the crisis is very clear, and that is the return to the less harmful energy sources.

REFERENCE

1. Environmental Department of KEK.
2. Article, 1, 6, 16, 17 of Law No.2004/30 for air protection.
3. <http://www.airquis.com/>
4. Ministry of Ambient and Living Environment in Kosovo.
5. Air quality Status & trends in India, <http://www.whoindia.org/>.
6. Urban air quality management, <http://www.worldbank.org>.
7. CPCB, Guidelines for Ambient Air Quality Monitoring, CPCB Publication,

National Ambient Air Quality Monitoring Series: NAAQMS/25/2003-04.

8. Masami Kojima, Magda Lovei, Urban Air Quality Management, Coordinating Transport, Environment, and Energy Policies in Developing Countries, World Bank Technical Paper No. 508.
9. Jitendra J. Shah, Tanvi Nagpal, Carter J. Brandon, Urban Air quality management in Asia, The World bank Publication, 1997.