ETHEKWINI MUNICIPALITY, HEALTH UNIT
POLLUTION CONTROL SUPPORT SECTION

AIR QUALITY INDEX

AIR QUALITY AWARENESS INFORMATION SYSTEM

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INTRODUCTION

POLLUTION CONTROL SUPPORT UNIT (PCSU) is responsible for monitoring air quality.

Primary objectives:

- to quantify the quality of air in South Durban basin (highly industrialized area surrounded by low to middle class income households)
- measure compliance with air quality standards
- provide a means of verification for dispersion models.
- effectively disseminate information to all stakeholders.

Information Dissemination

• Currently information is disseminated via weekly reports, annual reports, information sharing sessions and via our website, [http://www2.nilu.no/airquality/].

- Providing data to the public, institutions, industries, local, provincial and national government and other stakeholders.
- Current target audiences are people who have access to the internet
- "Experts" or people who have some knowledge about air pollution problems in eThekwini.
- One particular outcome that requires further enhancement is improved information dissemination so that relevant science based policy development and plans in air quality issues are communicated to the different stakeholders.

Only a small percentage of people have access to this information.

• Few have access to a computer

• Small percentage have access to the internet.

PROJECT DESCRIPTION

“Dissemination of air quality information to the people of eThekwini”

PROJECT OBJECTIVES

- To effectively communicate air quality information to all stakeholders at all levels, from experts in the field to primary school children and the citizen in the street.
- To educate the citizen in the street about air pollution and the associated health effects.
- To explore how air quality information can be exported for effective communication.
- To improve our information sharing so that relevant science based policy development and plans in air quality issues are communicated to the different stakeholders.
- Equip everyone with adequate knowledge so that they realize how important a role they play in their invironment and environment.
- Effective communication of information in the appropriate way can change behaviour.

We want to create an environmental mindset for all citizens of our beautiful city.

Air Quality Awareness Information System (AQAIS)

- The **AQAIS** is an effective communication tool to display air quality information on a plasma screen at a shopping mall.
- Air quality information in an easy to understand format.
- Data is extracted from a database (EnviewBk) and displays the averages of priority pollutants.
- 10-min sulphur dioxide, 1-hour nitrogen dioxide, 24-hour particulate matter (PM_{10}), 1-hour ozone, wind direction, wind speed and temperature in real time.
- An air quality index is displayed for each average value recorded at the different stations.
- Real-time data on the screen is updated every five minutes.
- Display other screens showing air quality information e.g. global warming, and climate change.
- Invitations to public meetings will also be displayed on this screen.
- An Administration page will operate in the background to enable the administrator to manage the display pages
- More screens will be installed at a later stage at different sites

AQAIS

Home | Admin

ETHEKWINI MUNICIPALITY

HEALTH UNIT:

POLLUTION CONTROL AND RISK MANAGEMENT DEPARTMENT

RAW AIR QUALITY DATA

4/8/2009 9:30:00 AM

POLLUTANT DATA

STATION	10-minute SO_2 (ppb)	AQI	1 hour NO_2 (ppb)	AQI	24 hour PM_{10} ($\mu g/m^3$)	AQI	1 hour O_3 ($\mu g/m^3$)	AQI
Southern Works	3.18	●	8.04	●	-	-	-	-
Ganges	3.05	●	14.89	●	25.79	●	-	-
Nizam	2.84	●	-	-	-	-	-	-
Wentworth	1.14	●	6.66	●	15.24	●	-	-
Settlers	4.27	●	-	-	-	-	-	-

METEOROLOGICAL DATA

CURRENT STATION	Wind Direction (deg)	Wind Speed (m/s)	Temperature (°C)
Southern Works	25.87° (North East)	5.45 m/s	24.24°C

Air Quality Index (AQI) ● GOOD ● MODERATE ● POOR

Call: Air Pollution Section on 031 311 3722 for more information. Website: www2.nilu.no/airquality


NEWSFLASH
AIR QUALITY MANAGEMENT SEMINAR
JUNE 2009
ETHEKWINI HEALTH UNIT INVITES YOU OUR ANNUAL SEMINAR
DATE: 5 JUNE 2009
VENUE: HEALTH AUDITORIUM, 9 OLD FORT ROAD, DURBAN
TIME: 8.30AM – 13.00PM
PLEASE CONTACT: LENNY ON 031 3113722 OR MADURAYN@DURBAN.GOV.ZA FOR MORE INFORMATION

AIR QUALITY INDEX

AQI is an index for reporting daily air quality.

- It tells you how clean or polluted your air is, and what associated health effects might be a concern for you.
- AQI focuses on health effects you may experience within a few hours or days after breathing polluted air.
- PCSU calculates the AQI for four priority pollutants - ground-level O_3, PM, SO_2, and NO_2.
- The limit and target values of criteria pollutants, as contained in SANS 1929, are used to calculate the AQI.

Pollutant	Guide Line Value		Good	Moderate	Poor
Sulphur Dioxide (SO_2)	191 ppb	10min	0-99	100-191	>191
Ozone (O_3)	102 ppb	1 hour	0-49	50-101	>101
Particulate Matter (PM_{10})	75 u/gm^3	24 hour	0-34	35-74	>74
Nitrogen Dioxide (NO_2)	106 ppb	1 hour	0-52	53-105	>105

AIR QUALITY INDEX

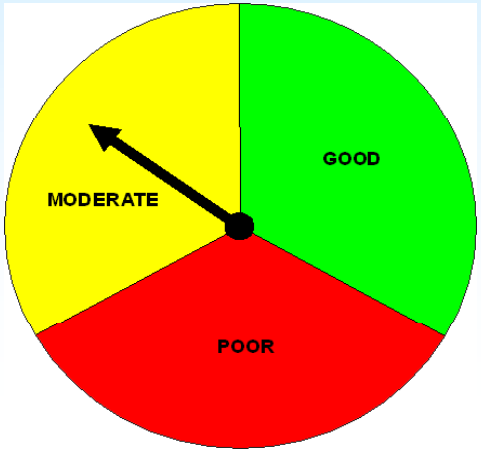
EXAMPLE

a) If SO_2 was 110ppb the AQI for SO_2 will show **ORANGE.**

b) If O_3 was 40ppb the AQI for O_3 will show **GREEN.**

c) If PM_{10} was 95ug/m^3 the AQI for PM_{10} will show **RED.**

d) If NO_2 was 51ppb the AQI for NO_2 will show **GREEN.**



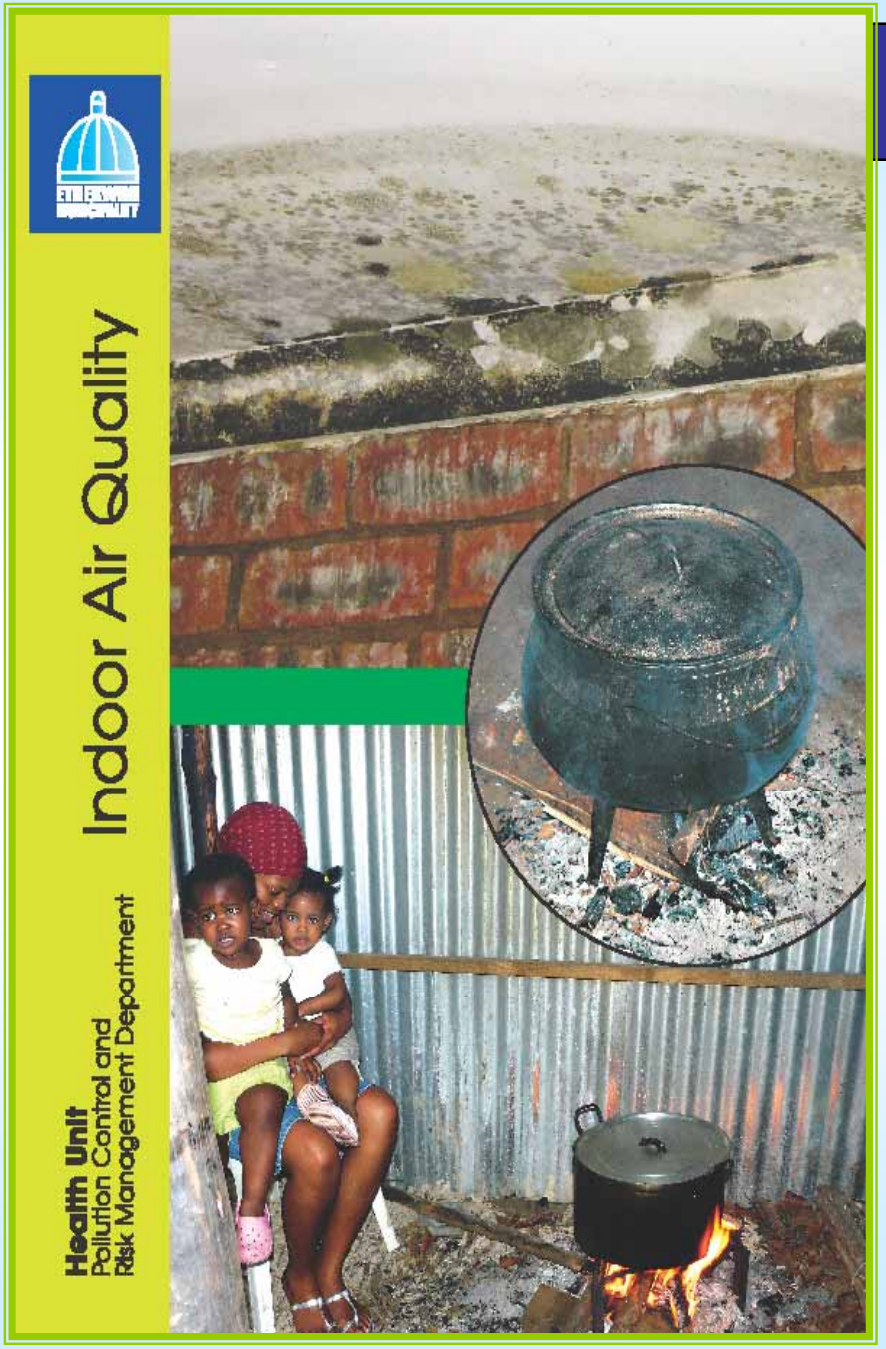
	•Air quality is considered satisfactory •Air pollution poses little or no risk.
	•Air quality is acceptable; •For some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
	•Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.

AIR QUALITY INDEX

- Complements the AQAIS
- Used as a tool to make information about outdoor air quality more easily understood.
- Provides information on how to interpret the different colours that will be displayed on the AQAIS display monitor at the shopping mall.
- The brochures will be distributed to the general public and children, at hospitals, schools, clinics, doctor's rooms and libraries

Brochure contents:

- What an air quality index is?
- How the AQI works?
- What can you do if the pollution levels are high?
- Description of the priority pollutants and its associated health effects.



INDOOR AIR QUALITY (IAQ)

The brochure consists of 4 A4 pages printed in a booklet format in 120g glossy paper.

Brochure contains the following information:

- Definition of IAQ.
- Indoor air pollutants and their sources
- Facts about poor IAQ.
- Health effects of poor IAQ.
- Possible signs of poor IAQ.
- Factors that contribute to poor IAQ.
- How does the structure of your home contribute to poor IAQ.
- What you can do to improve the quality of air inside the home.

THE RISING SUN CHATSWORTH - APRIL 7-13, 2009

WIN R5000 CASH
Simply answer this easy question
Competition extended to 10 April
SMS "WIN" followed by your Answer, & name, to 35072
SMS charged at R3.00
the Rising Sun Gold Circle Racing Carnival
12 April 2009 • B – 12 May 2009 • C – 12 June 2009
Example: WIN, B, Sandy,

thon last
qualifier

Thabiso Ngalonkulu (last year's runner-up) and
pe to land first position this year.

pay R50 to participate in the route.
An appeal is also being made to community members to assist in marshalling on April 26. All those who assist will receive the Ultra Marathon t-shirt. Contact Logan Naidoo on 083-997-1048 or Pud Maharaj on 083-255-1765 if you are interested.

TRAINING CENTRE

Indoor air quality awareness

Air pollution is generally thought of as being an outdoor problem. However the air that we breathe indoors is more polluted than the air outside. Pollutants released indoors are often more dangerous to us than pollutants released outdoors. Indoor Air Quality (IAQ) refers to the physical, chemical and biological characteristics of the air indoors, the physical, chemical and biological characteristics of the air indoors.
Poor indoor air quality comes from new or old homes, office buildings, cars, buses and trains, etc. Indoor air pollutants like carbon monoxide, lead and asbestos, comes from sources such as gas produced through incomplete combustion of fuels, including paraffin and building materials and roofing.
You can help to improve the quality of air inside the home by using uncontaminated paraffin, switch to other fuels for cooking and heating and opening all windows and doors especially when cooking and heating or using household cleaning materials.
The eThekwini Municipality manages a continuous air quality monitoring network, as one of the major elements of its Air Quality Management System. The network comprises of instruments owned and operated by eThekwini Municipality. The primary objectives of the network are to quantify the quality of air in South Durban (highly industrialized area surrounded by low to middle class income households) in particular, measure compliance with air quality standards and provide a means of verification for dispersion models. The network consists of 12 air monitoring stations, three of which are background stations and seven meteorological stations.
For more information about indoor air quality, visit www2.nilu.no/airquality or phone 031-311-3722 / 031-311-3555 (a/hrs) to report any cases of air pollution.

Cooking using biomass fuels can cause indoor air pollution.

NEWSPAPER ARTICLE

- Another way of reaching the masses is by publishing articles in local newspapers…which are free.
- This article was published in our local newspaper, the Rising Sun.
- eThekwini Municipality's paper, The Metro Ezasegagasini.
- Published every fortnight and reaches approximately 200 000 people.
- First article (Indoor Air Quality) will appear in a "health column" created for this purpose.
- These articles will be extended to other newspapers

AIR QUALITY INFORMATION CD/DVD

- We conduct presentations and training sessions for school children, university students, non-governmental organisation, other municipalities and industrialists.
- Serve as useful reference material

The CD/DVD contains:

- Message from Deputy Head:
- Introduction
- Continuous Monitoring Network Stations
- Description of pollutants
- Brochures
- Annual Reports 2005 - 2007
- Typical Weekly Report
- Air Quality Management Plan (AQMP)
- AQMP Presentations
- Air Quality Standards
- Photo gallery
- Useful links

- Distributed at schools, universities, seminars and workshops.

eThekwini Health Unit

Pollution Control & Risk Management Department

SULPHUR DIOXIDE (SO_2)

What is Sulphur dioxide?

Sulphur Dioxide is a colourless gas that has an unpleasant smell (like burnt matches and bad eggs). It is acidic.

Sources of Sulphur dioxide

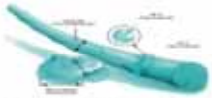
- Industry e.g. refineries, paper mills.
- Domestic burning of coal & oil.
- Exhaust emissions.
- Main human sources - burning fossil fuels, smelting, paper manufacture.
- Production of sulphuric acid via the Contact Process.

Health Effects

- Exposure to So2 causes breathing problems, reduced lung functions.
- Worsens the respiratory system & cardiovascular diseases.
- Causes inflammation of the respiratory tract.
- Can cause corrosion and discolouration.

PARTICULATE MATTER (PM)

What is Particulate Matter?



Particulate is the term used to describe a mixture of solid particles that include dust, dirt, soot, smoke & liquid particles suspended in the atmosphere.
Particles can be classified on the basis of their size, referred to as their "aerodynamic diameter". "Coarse particles" are those between 10 and 2.5 micrometers (µm) in diameter. "fine particles" are smaller than 2.5µm ; and "ultrafine particles" are smaller than 0.1 µm.

Source of Particulate Matter

- Anthropogenic (man made) which include: wood stoves, power plants, fuel combustion from diesel vehicles and road dust.
- Natural sources which include: windblown dust, bushfires, dust storms, pollens and sea spray.

Health Effects

- Exposure to particulate causes respiratory problems (coughing & painful breathing).
- Aggravates asthma in asthmatic patients.
- Bronchitis and cardiovascular disease.

OXIDES OF NITROGEN (NO_x)

What are Oxides of Nitrogen?

Nitrogen Dioxide is a reddish brown gas with a pungent and irritating odour. Nitrogen dioxide is one of the several nitrogen oxides. It transforms in the air to form gaseous nitric acid and toxic organic nitrates. NO_2 also plays a major role in atmospheric reactions that produce ground-level ozone,a major component of smog. It is also a precursor to nitrates, which contribute to increased respirable particle levels in the atmosphere.

Source of Nitrogen

- Primarily produced from fuel combustion, industrial sources & vehicles.
- Contributes to the creation of acid rain which impacts forests & other ecosystems.
- Natural sources of NO_x include lightning and the aerobic activity of soil bacteria.

Health Effects

- No_2 creates haze that cause eye and sinus irritation and affects the respiratory tracts.
- Decreased lung function increases the risk of respiratory symptoms such as acute bronchitis and cough and phlegm, particularly in children.
- Contributes to the creation of acid rain which impacts negatively on forests & other ecosystems.
- Effects on mortality can be attributed to long-term exposure.

OZONE O_3

What is Ozone?

Ozone is classified as a priority pollutant. Ozone is measured because it is the precursor of VOC. It is formed through the photochemical reaction of sunlight, NO_x (Nitrogen Oxides) & VOCs (Volatile Organic Compounds).

Source of Ozone

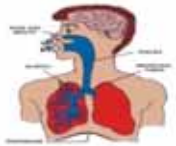
- The sources of ozone are actually the sources of the precursors which include the following:
- Fuel combustion and evaporation associated with cars, trucks, buses and equipment.
- Power plants, oil refineries, and factories.
- Cleaners, and solvents, aircraft, trains, construction equipment, agricultural operations and garden equipment.

Health Effects

- Ozone negatively affects the respiratory tract and the lungs.
- Causes inflammation of the respiratory tissues.
- Coughing, Throat irritation, Chest tightness, wheezing, or shortness of breath.

TOTAL REDUCED SULPHUR (TRS)

What are Total Reduced SULPHUR (TRS)?



Total reduced sulphur compounds are mixtures of gases that smell like rotten eggs or cabbages.

Source of TRS

- TRS is produced through industrial activities, paper mills, refineries and sewerage treatment plants.
- Natural sources which include swamps and marshes.

Health Effects

- Nausea and headaches as a result of the odour emitted.

CARBON MONOXIDE (CO)

What is Carbon Monoxide (CO)

Carbon monoxide is a colourless, odourless, tasteless and toxic gas produced as a by-product of the combustion process. The natural concentration of carbon monoxide in air is around 0.2 parts per million (ppm), and that amount is not harmful to humans.

Source of Carbon Monoxide

- CO is sourced through fuel burning appliance, vehicle emissions, fireplaces and woodstoves.
- Natural sources of carbon monoxide include volcanoes and bushfires.
- The main sources of additional carbon monoxide are motor vehicle exhaust and some industrial activities, such as making steel.
- Tobacco smoke is one of the main indoor sources of carbon monoxide.

Health Effects

- Inability of the blood to carry oxygen to the blood tissue & vital organs which include the heart & the brain.
- Increased levels of carbon monoxide reduce the amount of oxygen carried by haemoglobin around the body in red blood cells.
- Exposed persons concentration levels decrease. They become clumsy as their coordination is affected, and they could get tired more easily.
- People with heart problems are likely to suffer from more frequent and longer agina attacks, and they could be at greater risk of heart attack.
- Children and unborn babies are particularly at risk because of smaller lung capacity.

eThekwini Health Unit

Pollution Control & Risk Management Department

Air Quality Management Plan

PURPOSE of AQMP:

To provide the guidelines for the actions to be undertaken to help address the air quality status of the affected areas.

Sulphur Dioxide

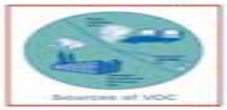
Particulate Matter

Flaring

Vehicle Emissions

Indoor Air Quality

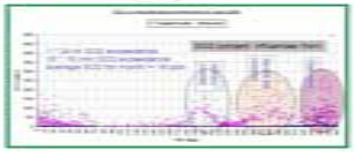
Volatile Organic Compounds



AQMP THEMES

- SO_2 reduction
- Flaring
- Particulate
- Matter
- Indoor Air
- Quality
- VOC's
- Jacobs Odour Study

Jacobs Odour Study



Our vision is to achieve a cleaner environment by improving the quality of air that we breathe, thus improving the quality of life of all citizens in the eThekwini

CONCLUSION

How challenges were overcome?

- Good project planning
- Good support and commitment from management

Improvement to policy changes?

- eThekwini Municipality, in terms of its Integrated Development Plan (IDP), has the responsibility to ensure that the people of eThekwini live in a clean and healthy environment.
- Aligned with Section 24, **Chapter 2** of the 1996 Constitution of South Africa
- “Everyone has the right - to an environment that is not harmful to their health or well-being.”
- Batho Pele (People First) principle states that, every citizen must have “access to information” and “there must be transparency”.

Contribution to our institution

- eThekwini Municipality, in terms of its Integrated Development Plan (IDP), has the responsibility to ensure that the people of eThekwini live in a clean and healthy environment.
- Aligned with Section 24, **Chapter 2** of the 1996 Constitution of South Africa
- “Everyone has the right - to an environment that is not harmful to their health or well-being.”
- Batho Pele (People First) principle states that, every citizen must have “access to information” and “there must be transparency”.
- Assists our operational team to quickly notice problems on the monitoring network
- Created interest amongst other departments and institutions.

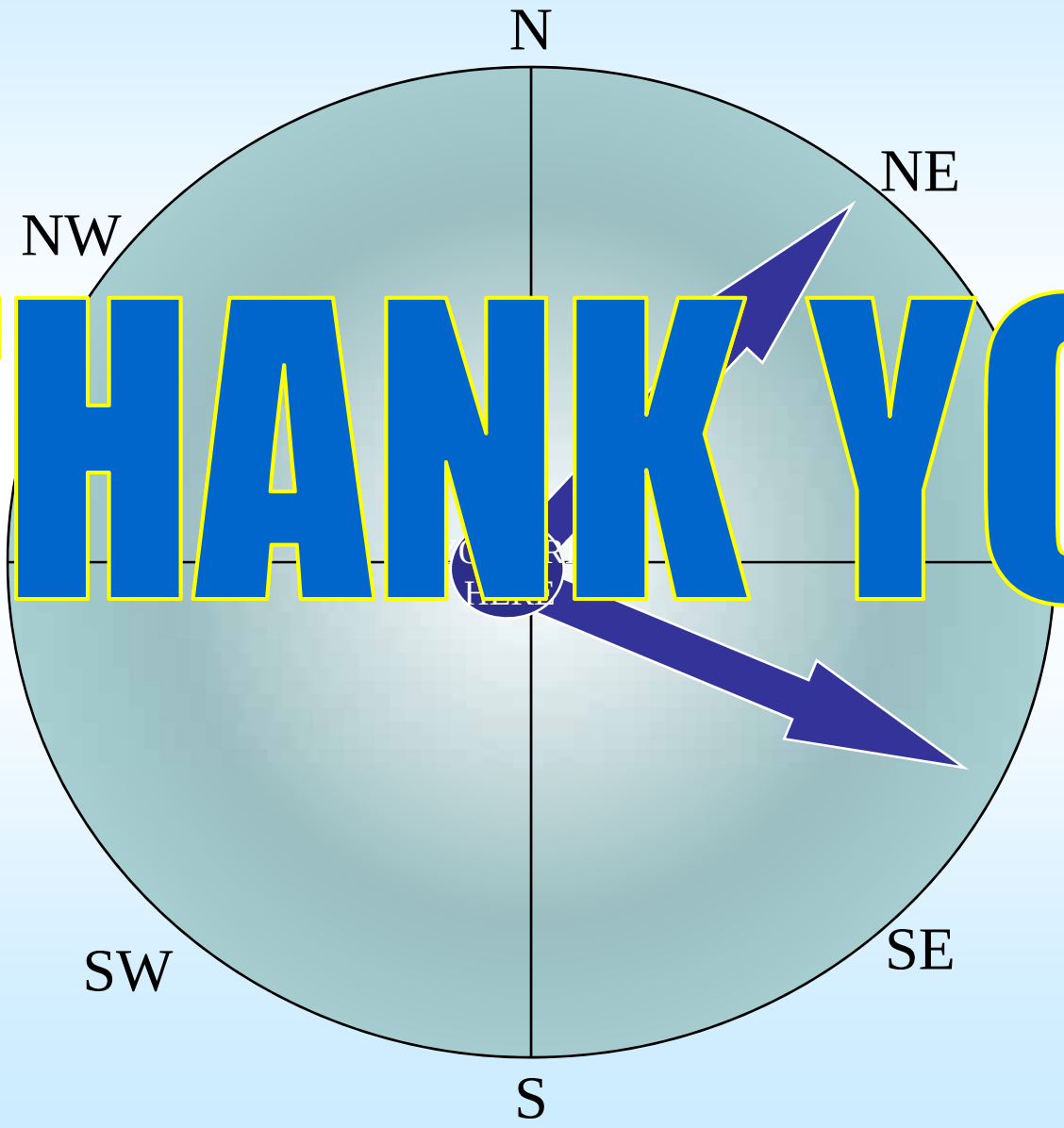
Sustainability and replicable

- AQAIS is web based with a SQL database in the background
- Accessible from the internet as well
- Display screens can be mounted at any site with wireless or network capabilities
- Can be easily adapted to link to any air quality database

Lessons learn’t

- Management commitment buy-in and support
- Good project management skills ..clear project objectives and outcomes…little or no deviations…modular based.
- Backup plan for the backup plan

THE WAY FORWARD



THANK YOU