AIR QUALITY MONITORING & HEALTH PROGRAMME IN ACCRA, GHANA

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30 August 2016

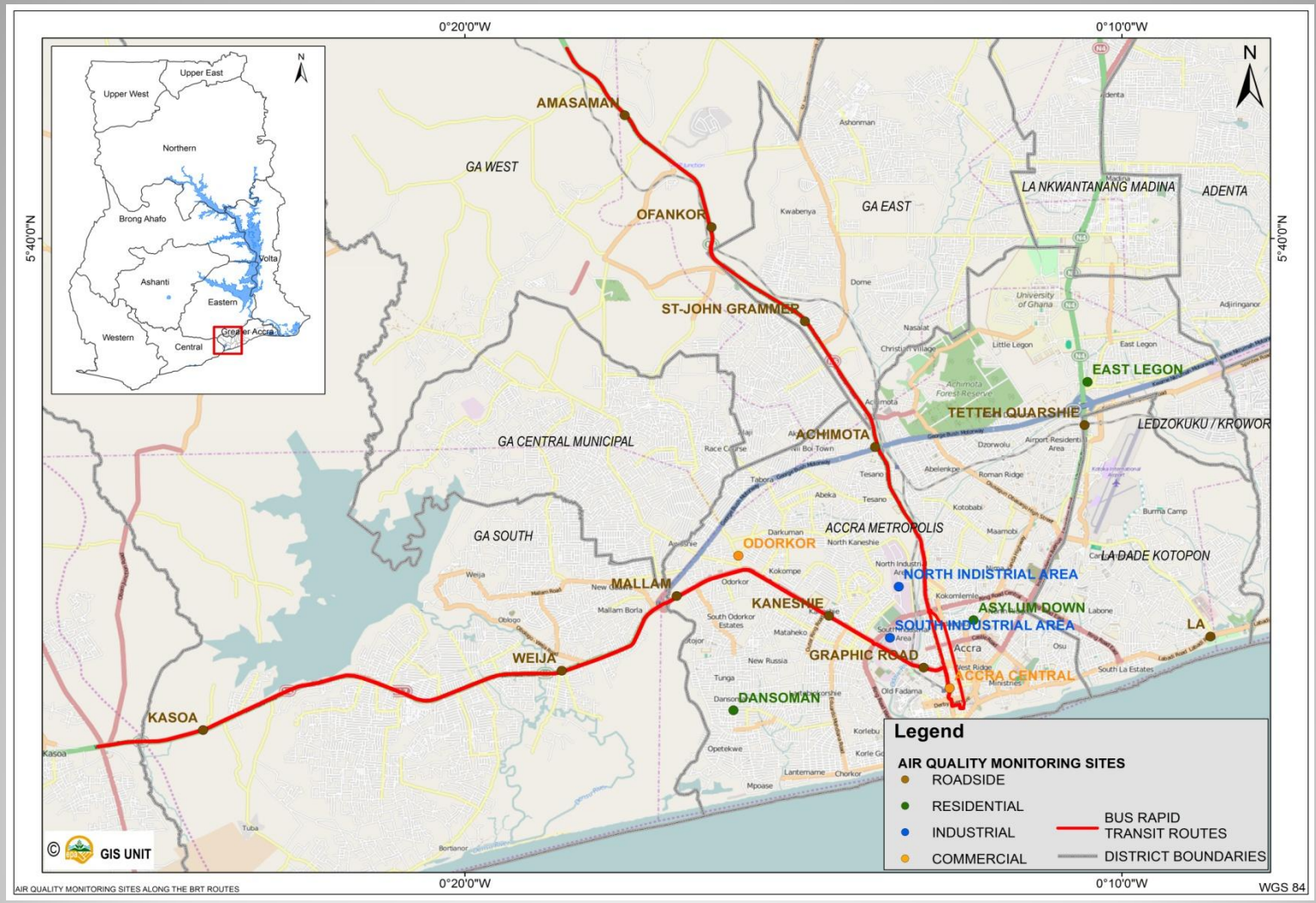
Presentation Outline

- Accra-Capital & medium sized City of Ghana (area of area:2,592 km2 and is the fastest fastest growing urban area in Ghana etc.
- Major sources of Air Pollution in Accra
- EPA Ghana's mandate
- Milestone of Air Quality Monitoring (AQM) in Ghana
- Work done on AQM in Accra
- Outcomes of AQM Implementations
- Challenges of AQM & Pollution reduction in Accra
- Way Forward & Conclusion

air pollution problems in Ghana)

Mandate of EPA Ghana

- The EPA Act 1994, Act 490 mandates the Agency
- to co-manage, protect and enhance the country's environment;
- to seek international and multilateral collaboration in managing the country's environment
- Based on mandate EPA started AQM programme started in Accra, Tema, Kumasi, Takoradi and Tarkwa in 1997 (WB Sponsorship).
- Built capacity on air quality monitoring
- Undertook vehicular emission inventory
- Urban Transport Project-AQM programme
- Air Pollution & Associated Health studies in Ghana (by GHS)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GA CENTRAL MUNICIPAL
GA SOUTH
GA EAST
LA NKWANTANANG MADINA
ADENTA
EAST LEGON
TETTEH QUARSHIE
LEDZOKUKU / KROWOR
ACHIMOTA
ACCRA METROPOLIS
ODORKOR
LA DADE KOTOPON
NORTH INDISTRIAL AREA
MALLAM
KANESHIE
ASYLUM DOWN
SOUTH INDUSTRIAL AREA
LA
WEIJA
GRAPHIC ROAD
ACCRA CENTRAL
DANSOMAN
KASOA
Legend
AIR QUALITY MONITORING SITES
ROADSIDE
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© GIS UNIT
AIR QUALITY MONITORING SITES ALONG THE BRT ROUTES
WGS 84

OUTCOMES OF AQM IMPLEMENTATION

FIG1. PM10 CONCENTRATIONS (µg/m3)RECORDED ALONG THE PROPOSED BRT ROUTE: JAN - DEC 2014

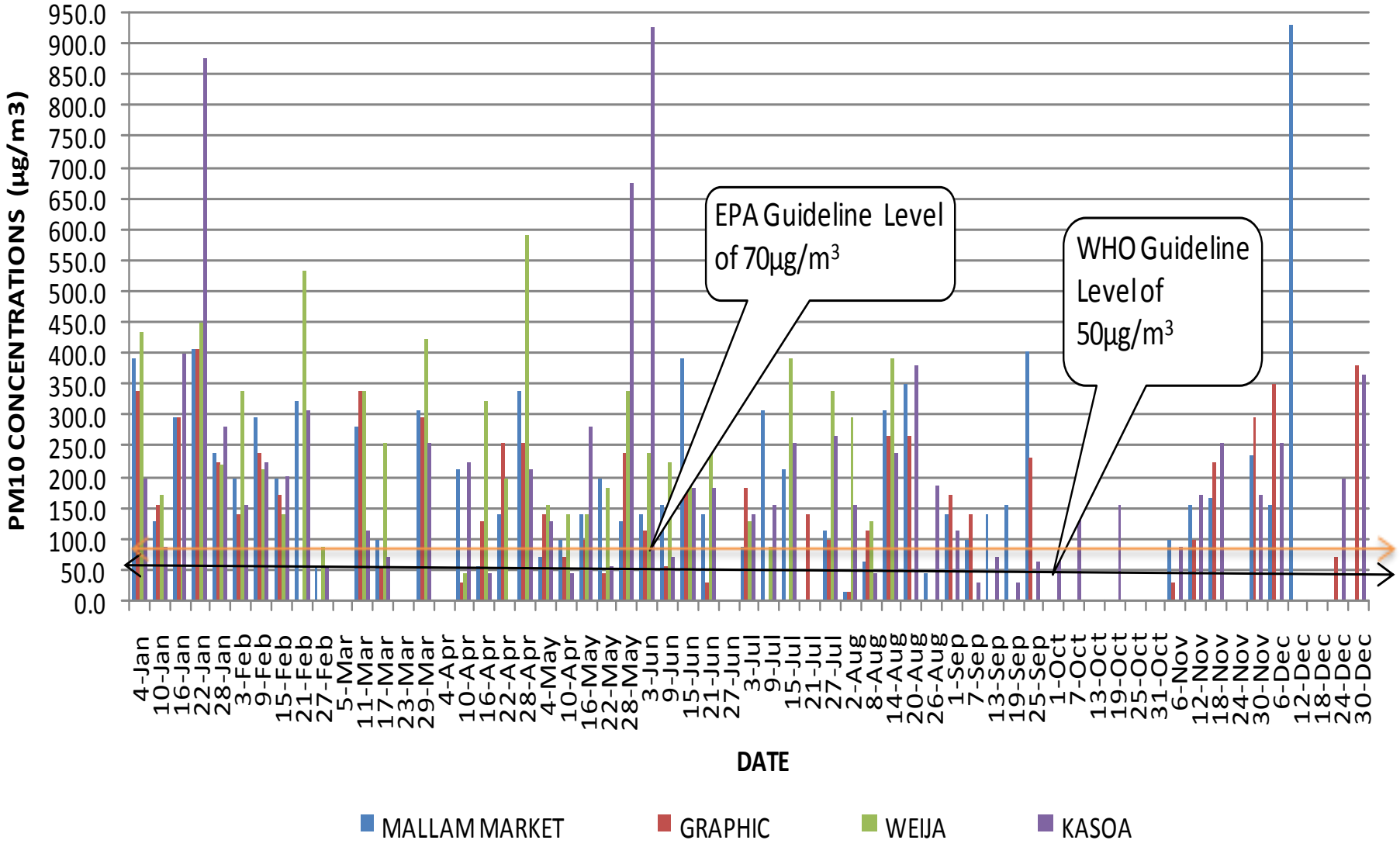
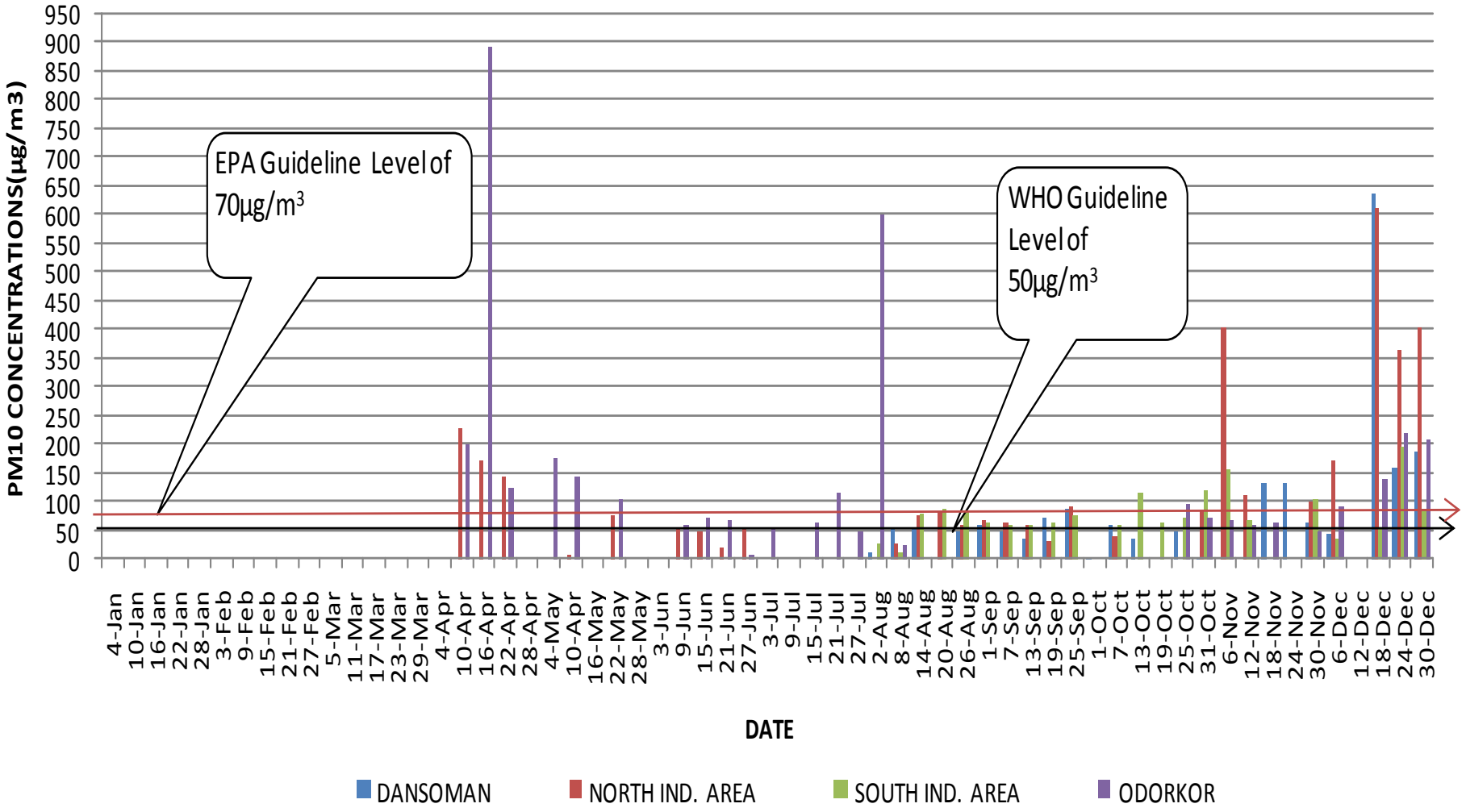


FIG.3 PM10 CONCENTRATIONS (µg/m3) RECORDED AT THE PERMANENT MONITORING LOCATIONS JAN - DEC 2014



AIR QUALITY INDEX (AQI) SYSTEM

- AQI is a measure of the quantity of harmful particles and chemicals in the air
- The AQI is an index for reporting daily air quality. It tells us how clean or polluted your air is, and what associated health effects might be a concern for us. The AQI focuses on health effects one may experience within a few hours or days after breathing polluted air.
- EPA calculates the AQI on PM, O3, CO, SO2, NO2.

How Does the AQI Work?

- It runs from 0 to 500 scale with the higher AQI value, indicating a greater level of air pollution and a greater health concern to the public.

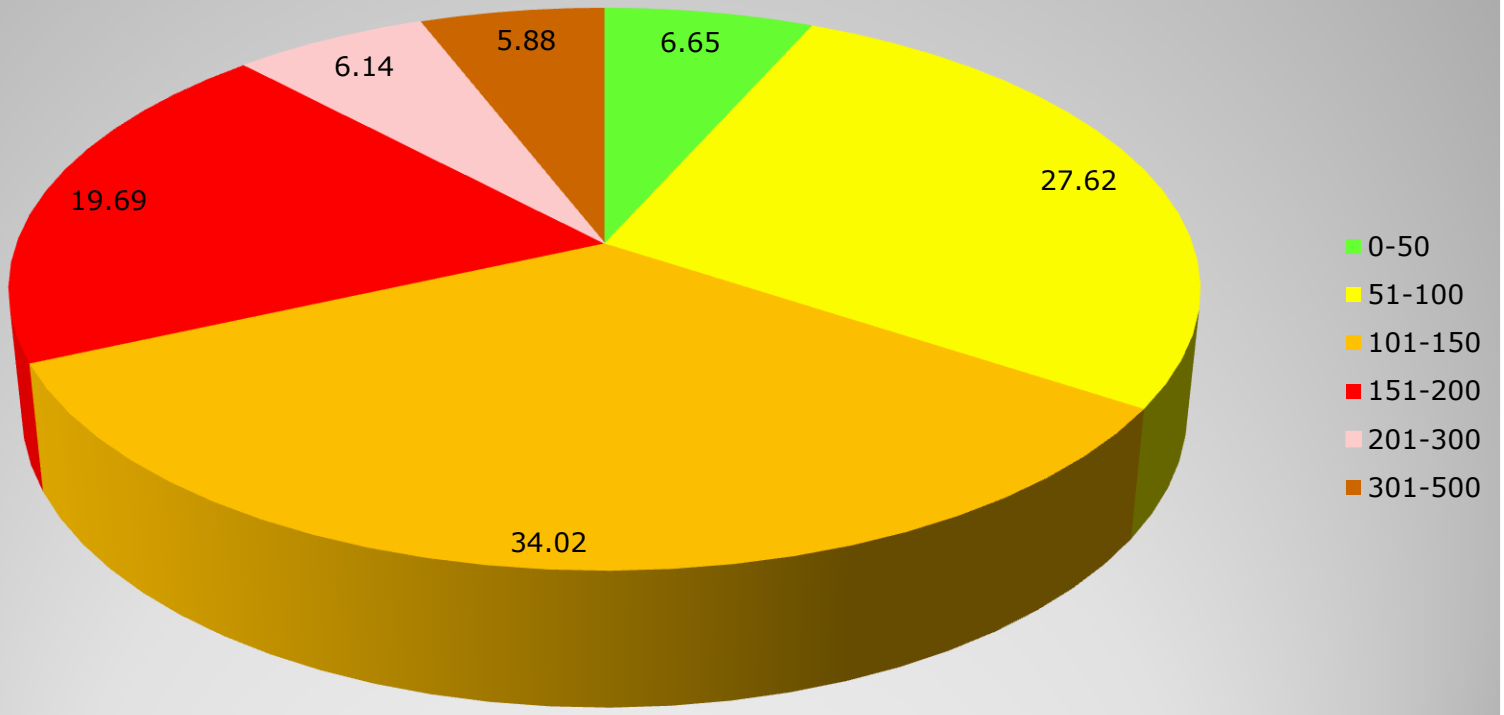
Understanding the AQI

- To make it easier to understand, the AQI is divided into six categories depicted by 6 colour coding system (Green, Yellow, Orange, Red, Purple and Maroon)
- Each category corresponds to a different level of health concern; as shown in next slide

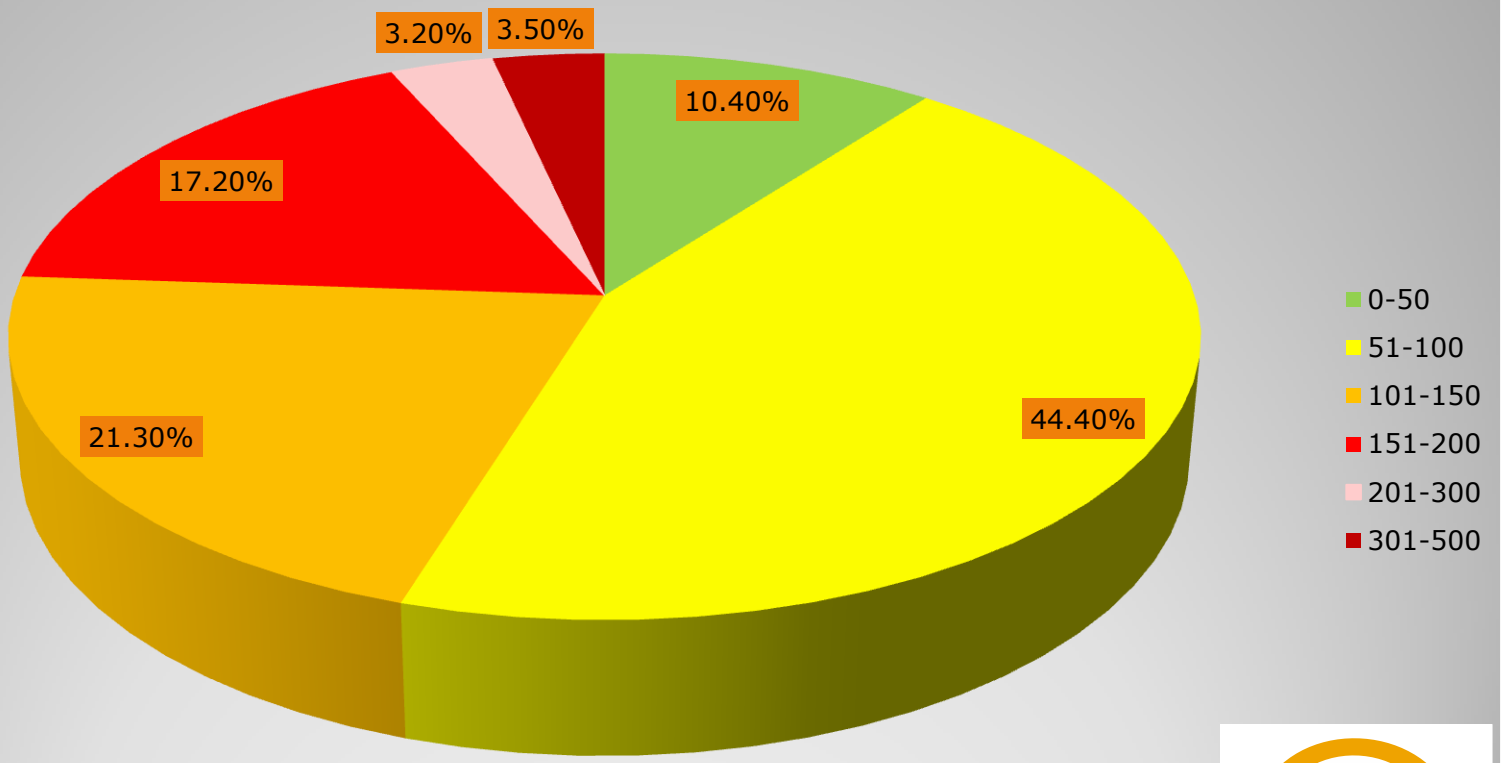
AQI GUIDE FOR PM10

Air Quality Index (AQI)	Levels of Health Concern/Protect Your Health
When the AQI is in this range:	***..air quality conditions are:***
Good (0-50)	No health impacts are expected when air quality is in this range
Moderate (51-100)	Unusually sensitive people should consider limiting prolong outdoor exertion
Unhealthy for Sensitive Groups (101-150)	The following Groups should limit prolonged outdoor exertions: ▪ People with lung disease, such as asthma ▪ Children and older adults ▪ People are active outdoors
Unhealthy (151 to 200)	The following groups should avoid prolonged outdoor exertions: ▪ People with lung disease, such as asthma ▪ Children and older adults ▪ People are active outdoors ▪ Everyone else should limit prolongd outdoor exertion
Very Unhealthy (201 to 300)	The following groups should avoid all outdoor exertions: ▪ People with lung disease, such as asthma ▪ Children and older adults ▪ People are active outdoors Everyone else should limit prolonged outdoor exertion
Hazardous (301 to 500)	Everyone should avoid any outdoor exertion

Status of 2013 AQI



AQM Results: 2015



Health Based effects of Air pollution (AQI): 2013-2014

- **Roadside locations**: 1. Green 31(9.17%) 2. Yellow : 116 (34.32%). 3. Orange (UFSG): 100 (29.59%)
4. Red (unhealthy): 55 (16.27%)
5. Purple (very Unhealthy): 23 (6.8%)
6. Maroon (Hazardous): 13 (3.85%)
- **Residential location:**

1. Green 10(47.62%) 2. Yellow : 7 (42.86%).
3. Orange (UFSG): 2 (9.52%)

Commercial location: 1. Green 5(18.52%) 2. Yellow : 15 (55.56%). 3. Orange (UFSG): 6 (22.22%)
4. Maroon: 1 (3.70%)

Health Based effects of Air pollution (AQI) Cont'n

- **Industrial Locations:**

1. Green 11(23.40%)
2. Yellow : 26 (55.32%).
3. Orange (UFSG): 6 (12.76%)
4. Red (unhealthy): 0 (0%)
5. Purple (very Unhealthy): 2 (4.36%)
6. Maroon (Hazardous): 2 (4.26%)

Findings of Air Pollution & Health studies in Ghana

- Lower respiratory infection is second to malaria among top 10 causes of death in Ghana (GHS, 2010)
- Household air pollution (HAP) tops the Burden of diseases in Ghana.HAP causes 3,000 deaths of children under 5yrs.
- Association between incidence of ARIs and pollutants most marked for PM10 levels.
- Trends in incidence of ARIs follows PM10 level – Changes in ARI incidence occurring soon after changes in PM10s.
- Peaks: June-July; November – January
- Highest PM10 levels occur in roadside locations.
- Children aged 5yrs and below/asthmatics are most at risk of ARI

Challenges of AQM & Pollution Reduction in Accra

- Lack of policy direction on continuous importation and use of old vehicles.
- Poor maintenance of vehicles.
- Citing of commercial and some residential facilities along major roads.
- Gaps in data gathering due to frequent shortage of consumables and lack of availability of monitoring vehicles/drivers. Limited Manpower
- Theft of air quality monitoring equipment
- Frequent vehicular knockdown of air quality monitoring posts.
- Lack of funds and logistics for AQM, public education and pollution related health studies.
- In ability to report AQM outcomes promptly to public

The Way Forward

- Establish Continuous air quality monitoring stations in Accra & relating monitoring results with respiratory to aid in prompt reporting of air quality/health situations to public.
- Speeding up the development of air quality/emission standards/Regulations.
- Reduction of Sulphur levels in fuel to 50ppm before 2020.
- Implement fuel economy initiative
- Promoting use of Non-burn techniques in management of health care waste/e-waste
- Institution of Mass transport system in Ghana
- Government taking a look again on the policy of importation of over-aged vehicles/scrap vehicle parts & engines.
- Further research: areas of AQM, exposure and epidemiology studies

Conclusions

- Roadside and commercial sites mostly have high levels of particulate matter. This can be attributed to road dust, commercial activities, wind blown dust and vehicular exhaust emissions.
- Correlate the health impacts associated with outdoor and indoor air pollution as well as the vehicular emissions data in Accra on citizens especially the vulnerable group (children, women and the elderly).
- Create awareness on the health effects of air pollution.
- Research – For better understanding of magnitude of the problem of pollution related ill-health thru:

- Exposure Assessments: for air pollutants
- Epidemiological studies: Relating exposures to disease entities. - Respiratory, cardiovascular & other diseases attributable to different sources of air pollution

Let's clean the air !

Let's repair the environment!

Let's enjoy health & wealth!

Thank you

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24 -Hour PM10 Concentration Measured at five location along the BRT route: 2013

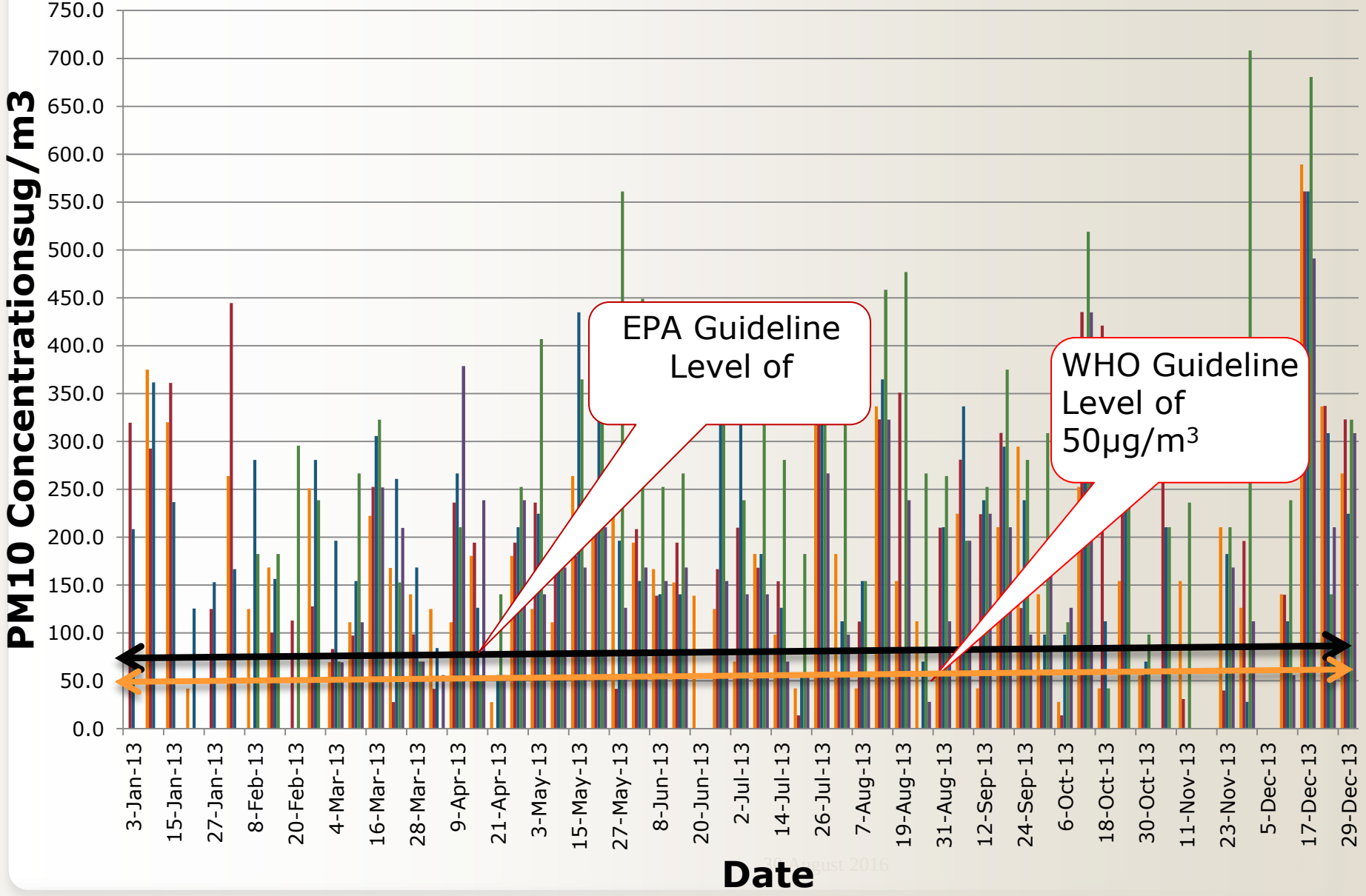
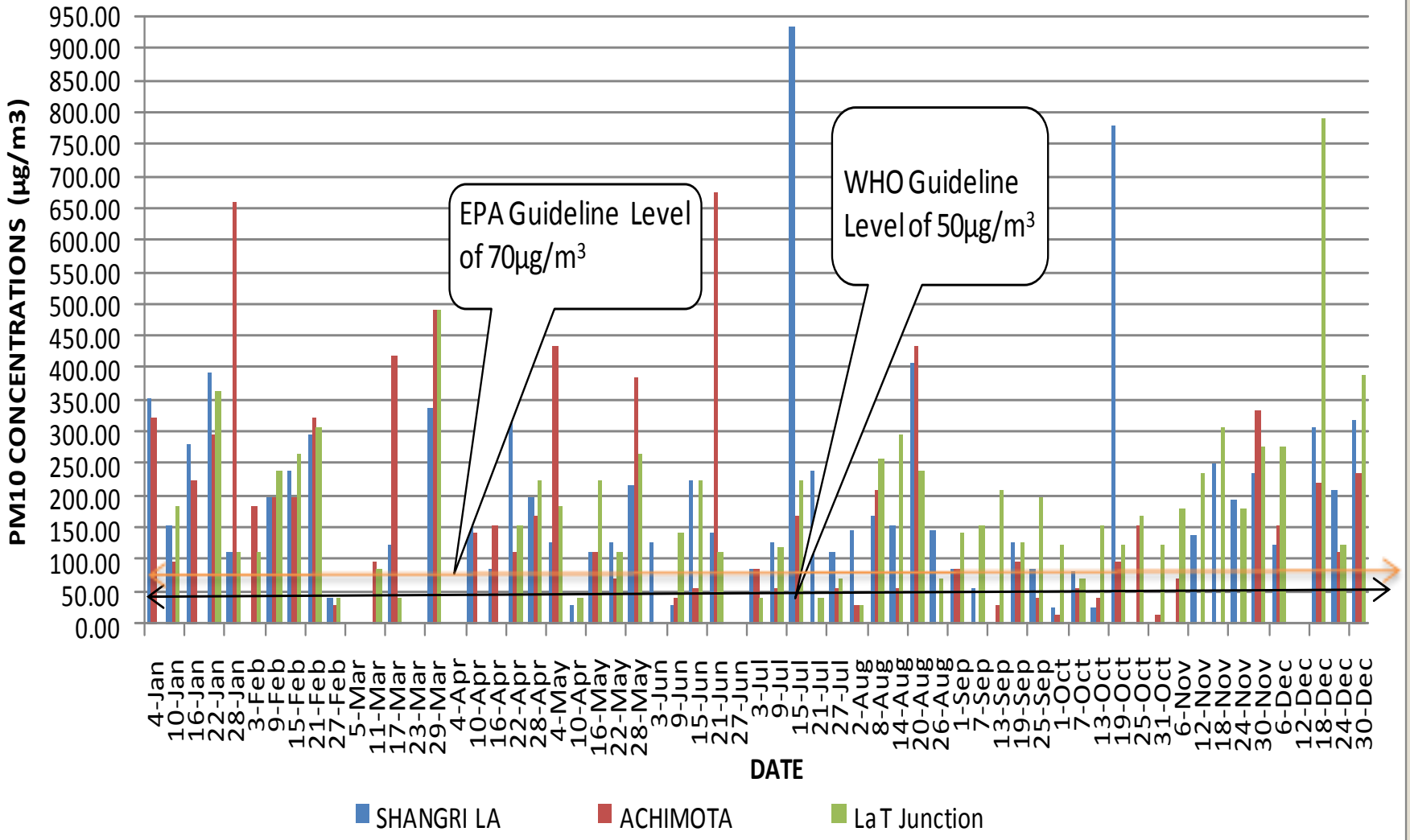


FIG. PM10 CONCENTRATIONS (µg/m3) RECORDED AT OTHER ROADSIDE MONITORING LOCATIONS JANUARY - DEC EMBER 2014.



Findings: PM10, Pb, Mn,SO2, NO2,O3 Concentrations

- Generally the PM10 concentrations recorded at all the location in Accra are higher than the EPA-Ghana 24-hour PM-10 air quality guideline of 70 ug/m3 and the WHO Air quality guideline for 24-hour PM10 of 50ug/m3. (Ranged from 17-1114 ug/m3)
- Generally, Pb, Mn, SO2, NO2, O3 concentrations are lower than EPA Ghana/WHO guidelines