

Air Quality Challenges in a Port City - Southampton

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This is the first draft of article on air quality challenges in port city starting with Southampton in the UK. This report is intended as part of larger paper concerning the quality of air in the UK major towns and cities.

Introduction

When air pollution in a city comes to mind, it indicates towards a number of problems such as, the levels of pollution people are exposed to, the main sources, locations, and the number of fatalities. The impact of toxic pollutants (industrial, road traffic and shipping) on communities health is as such that the illegal levels is now believed to be the failure of ruling powers for inaction to remove catastrophic health hazards and also the lack of being proactive to take action in the last decades. In some countries the levels are far below the legal limits and that indicates towards more investments together with attention given to compliance with rules, regulations and the requirements of the legislations on environmental health. There are no other magic solutions to the crisis of non-compliance, other than having a discipline of taking control and avoiding unacceptable risk taking. We have seen a shocking level of sanitation and also non existence of public health standards in some developing world countries, which is due to government culture and the lack of financial backing to proper investments in public health infrastructure. By now lessons should have been learned, so that there is no air, land and water pollution on a large scale in the developed world.

According to the World Health Organisation (WHO), 47 towns and cities in the UK have unsafe air pollution levels but 32 of these are above the 10 micrograms per cubic meter, with reference to particulate matter PM2.5 levels. Their study shows that there are 20 towns and cities in the UK that are the top worst places for air pollution levels, but London with high pollution was not in the top 20. Southampton is in the top 20 worst cities and towns in UK, as it has reached level 10 micrograms per cubic metre.

With reference to petrolprices.com, 9 out of 10 people are exposed to air pollutant, and that 7 million people die each year because of it. On 10th January 2019 the BBC news were broadcasting that aeroplanes using electricity as a fuel will be soon flying around the world, and also that in most advanced car industries the trends show that they are diverting from pollution making vehicles to moving towards manufacturing electric type instead. Steps are being taken by the government that by 2040 the sale of diesel and petrol will be banned, but there are concerns about making batteries and using electricity (reference petrolprices.com). Technologies such as fuel cell to power vehicles which use hydrogen gas, has an output of electricity and water, is now in its infant stage. It is said that trucks and trains also will use Fuel Cell.

With reference to Andrew English, motoring correspondent, it was the Welsh scientist and Justice of the Peace Sir William Grove, who discovered that electricity can be produced by electro-chemical reaction between hydrogen and air which was called “Gas Battery”, but now we know it as Fuel Cell, which has an output of, electricity, heat and water. The Telegraph (News-Cars), foresees the trains to run on hydrogen fuel cell for British railways by 2022 calling it the Breeze Trains. The British Broadcasting Cooperation (BBC) reported on 17th January 2019 the Cumbrian project for building the Nuclear Power Station for the Lake District region is not going ahead and that the decision making authority is looking into green power from renewable sources, which are cheaper than electricity from the Nuclear Power Station. From the Environmental Protection and public health point of view this may be a better choice for long term investment, but for the immediate boost to the local economy, some economist believe, it may not be an advantage.

The BBC reported on 11th January 2019, regarding the death of 9 year old Ella-Kisi-Deborah, that her mother Ms Rosemont Ado- Kisi- Deborah has delivered a 100,000 signature petition to the attorney general calling for a new inquest (2nd inquest in 2019 is now called for) into her daughter’s death in 2013, which was as a result of illegal level of pollution near their home in Lewisham, London. This alarming situation and other reports of asthma sufferers and vulnerable people indicate towards an immediate change into nationalisation of public transport. For example railways are in dire need of good management as the delays and cancellations cause the need for people to use cars and buses more, which adds to the pollution. There is a need to review the problems of public transport with reference to air pollution and bring about an action plan for serious commitment to develop a strategy to provide a reliable infra-structure for running electric cars, trains and other vehicles together with preparing for other options for a free pollution fuel system, such as fuel cell for cars and public transport.

According to the Department of Environment, food and rural affairs (DEFRA) 331,000 tonnes of Nitrogen Oxide (NOx) pollutants, was produced mainly as a result of powering petrol or diesel vehicles. It seems that Southampton Council is offering concessions to electric vehicle drivers. They are working to develop infrastructure for the use of electric cars, for example a network of charging points in strategic parts of the city, or car parks. They are giving parking reductions of 90% for electric cars, and also free crossing over the Itchen Bridge for electric cars. The government offers grants for new plug-in vehicles and tax incentive concessions. Transport networks reports that Southampton City Council wants the City’s port to be first in the country to implement Shore Power for cruise liners to resolve the ship pollution problem. BBC reported that Southampton port does not monitor air pollution caused by shipping.

How Shore Power Works

BBC says while cruise liners and container ships waiting in the docks, instead of leaving their engines running for power, they can use plugs at port to power their vessels and this prevents

the air pollutants damaging the health of the local community and population. Southampton council and the residents want shore power to be implemented. In USA 99% of nitrogen dioxide and 70% of the particulate matter (PM) pollutants have been removed, as a result of ships using shore power (reference Alan Whitehead Labour MP for Southampton Test).

The University of Southampton points out that the research carried out by Dr Matthew Loxham, BBSRC Future Fellow in Respiratory Biology and Air Pollution Toxicology on the impact of air pollution on health in Southampton docks is very alarming. He says “we should not only just think air pollution relates to traffic vehicles, but we also need to focus on ships and docks that could have an impact on our health”. He adds “there is no quick fix. I don’t think pollution will ever be completely eradicated, but it’s about using science to understand what the effects on health are and how we can minimise those, to improve quality of life in an intelligent way while reducing the potentially disruptive effect of some measures on the economy and infrastructures”. According to a new report involving Southampton researchers, air pollution causes around 40,000 deaths and costs the UK economy £20 billion every year (Reference: University of Southampton).

Southampton Air Quality Action Plan

There is a 2nd Atmospheric pollution workshop, which was set up at the University of Birmingham in 2017. From the associated British Ports input we have the following:

The cause of pollution in Southampton is assessed to be 34.1% from heavy goods vehicles, 23.9% cars, 23.1% household pollution, 7.6% light goods vehicles, 6.9% port and 4.5% buses. These results are based on nitrogen dioxide at M 271 and A 33 junction, Redbridge. Monitoring from different locations in the port area shows NO_x, PM₁₀ and PM_{2.5} below national levels.

The following measures have been highlighted:

- 1) All vessels visiting must operate on low sulphur diesel/exhaust cleaning systems.
- 2) Proportion of shore power ready vessels low. All sectors favouring use of LNG (Liquid Natural Gas) as future operating fuel.
- 3) Cost of shore power infrastructure high.
- 4) Feasibility study for shore power connection nearing completion.

Southampton Council’s input would be in form of taking action on delivering the Clean Air Strategy. These require transition to low emission fleet, clean air zones and penalty charging. Supporting green transport by incentivising and improving the road network could reduce emissions from both domestic and industrial building.

We can summarise by pointing out the Environment Act 1995, and its requirement for local authorities to monitor, review and assess the air quality in their environment. They need to check if there will be a breach and then take the necessary steps to prevent and reduce the level of pollution. They are required to designate air quality management areas (AQMA).

Southampton ports are said to be handling 14 million tonnes of freight every year. There is also 6.9% NO₂ emission in the city to tackle. The port operation is asking for more monitors at the strategic points on site to help better assessment, which can lead to implementing more improvement. Air quality has been improved in the past 30 years, but more improvements are required to bring Southampton to a satisfactory compliance outcome with reference to government targets.