



AIR QUALITY CONFERENCE REPORT AND OBSERVATIONS



Centre for Factories of the Future (C4FF)

Air Quality Conference
Coventry, Warwickshire and Rugby
20th - 21st June 2019

Conference reports:

1. Foreword by Professor Reza Ziarati
2. The Conference Report by Tony Dalton,
3. The Observations by Professor John Flower
4. Notes from dignitaries by Anita Dalton
5. Conference Presentation Slides accessed on MariFuture June 2019 News:

<http://www.marifuture.org/Publications/News/June2019News3.pdf>

Air Quality Issues on the Midlands and Warwickshire with Special References to Situations in Coventry and Leamington

Professor Dr Reza Ziarati BSc (Eng), PhD (Eng), Cert Ed, CMechE, CElecE, CMarEng, CEng, FIMechE, FIET, FIMarEST - Chair, Centre for Factories of the Future

There are nine reports being prepared on air quality assessment in several locations worldwide; three of them are general reports on the situations in the UK and the other six reports summarise the arrangements for improving air quality in several cities and makes special references to measures in place in the USA and the cities such as Paris, the latter as a specific example of what happens in the EU.

The main reason for this foreword is to ensure that local councils in the Coventry and Warwickshire become aware of the residents concern about air pollution in our cities and towns and hope that the local councils would do what is necessary to make sure any new planning for new buildings does not adversely affect the residents' health in the region and wider afield.

The local councils are probably aware that the World Health Organisation (WHO) has reported that 31 cities/towns in the UK have exceeded the pollution limits for NO_x and PM₁₀ and cities such as Coventry is one of 31 cities/towns. Having done some sampling in recent year I know that one of the worst levels of pollution are around Holyhead, Coventry town centre to University Hospital, Warwick-Leamington Road and around the Warwick University, the latter particularly in the morning and afternoon during the rush hours. The British Heart Foundation (BHF) is clearly concerned that the UK is not taking the pollution issues seriously. It is interesting to note that the UK Government (Department for Environment, Food and Rural Affairs) has stated that it is aware of the adverse pollution impact on the health of men, women and children as outlined by the British Heart Foundation (BHF) yet has not written into law the WHO guidelines.

I believe the local councils first objectives should be to safeguard the well-being of our residents and ensure that there is an adequate infrastructure is in place to ease the congestion and bottle-necks around the areas. The University should also take the concerns of the residents more seriously and be encouraged to consider expanding elsewhere. The new NAIC (National Automotive Innovation Centre) building will very shortly house some 2000 primarily young engineers once all associated vacancies are filled, all new comers would probably wish to drive to the University adding to the traffic chaos in the morning and afternoons. I am aware that we need to work with University, and the associated Councils, to make sure before any further developments there are serious plans for infrastructure to ease traffic and reduce the excessive amount of harmful pollutants by installing more pollution measuring devices and ensure that they are regularly calibrated.

The quantity and the impact of harmful emissions from traffic particularly during rush hours along the Westwood Heath Road are causing grave concern. You may be aware that some 100,1000,1000, 1000, 1000 kgs (Ziarati et al, 2018 - IAMU 2017 – IAMU 2017 Proceedings Maritime Energy Management System (MARIEMS) Online Delivery Platform, Varna, Bulgaria) of CO₂ alone is pumped into our atmosphere every year without any Council taking these poisonous pollutants into consideration. In addition a similar magnitude of NO_x and particulates and associated pollutants are also discharged into our closed atmosphere. As an engine designer I have measured the level of pollutions in Westwood Heath several years ago during the rush hour the amounts of CO₂, NO_x and

other harmful emitted pollutants were above the recommended levels. Considering that the level of traffic has increased considerably and heavier vehicles now used the area around the University regularly, I suggest the Councils (both Coventry and Warwick) jointly sponsor and carry out an independent investigation on the level of pollutants in the area during the rush hours. This investigation must be independent and carried out during the rush hours and should include days during winter.

Some of the residents have suffered respiratory related ailments and my own neighbour has been recently diagnosed with a chronic lung cancer. It is prudent and obligatory therefore that before any planning for new buildings or housing the local Governments do their duty and ensure people's well being is put above all else.

I am providing a link to series of development papers I compiled in collaboration with several major international organisations recently funded by the UKNA/EU so that interested parties can refer to it and note the problems our planet is facing - http://www.marifuture.org/Reports/Development-Papers/ADP_12_2016_MARIFUTURE.pdf. References should also be made to the Tokyo Protocol and the Paris Agreement. The UK is a signatory to these air pollution treaties. It is viewed that any plan which knowingly could lead to a greater amount of deadly pollutions to be discharged into our environment is against the core and spirit of the treaties signed. I am very much in favour of creating opportunities for young people and adults and in support of industry and commerce but surely we should not poison the students and all those who work at the University and make the life of residents around the University worse than what it is.

I have lived in the area for some 30 years and used to cycle to my office at University Campus but gave cycling up some 10 years ago when I developed serious chest pains and became aware that the traffic pollutions on the way to my office at several locations are well above the permitted levels. One of the reasons for moving my office from the Warwick University campus to Kenilworth several years ago was the level of pollutions during the rush hours.

In a recent University report it was noted that the mean pollution levels are well above the legal limits and may be more as the report does not include any actual readings. What is significant is that the actual readings, at the worst locations, damage one's health to a maximum. When a person is injured with a six-inch knife, it cannot be said that the cut has a mean value is 1/8th of an inch over 24-hour period. As I stated earlier WHO and BHF are very concerned about 31 cities which includes Coventry exceeding the legal limits in the UK. What is equally alarming is that the UK has now been referred to European Court of Justice (ECJ) for exceeding the EU pollution limits; the fines are anticipated to be very high. The Cllr's and city leaders as well as Doctors are all very concerned. It would be negligent of our Cllr's both at Coventry and WDC to approve any expansion scheme in an area which already exceeds legal limits, jeopardising the well being, specifically compromising the health, of local residents as well as the unaware students and people working or visiting the University.

I have been informed that the UK Government has also been given the final warning and has been referred to the European Court of Justice for ignoring the well-being of its citizens. The UK Environment Act 1995 is now some 23 years old and the UK's Local Air Quality Management (LAQM) and Air Quality Management Areas (AQMA) are inadequate for the reasons I have outlined below. I

am not sure if WDC even have a AQMA and relying instead on air pollution and dispersion theoretical models which have proven to be unreliable.

Even if we ignore the WHO and the EU warnings and accept the current modus operandi **the majority of pollutant measuring stations in Coventry and several places in Leamington read over the UK Government's own targets**. Surely this is a cause for concern! Using the own local Council's readings it is clear the in most areas the pollution has increased by 10% each year and to the best of my knowledge the Council have not installed any measuring device around the University other than the two diffusion tubes near A45 despite their responsibility to include these in AQMA particularly because of the major constructions and substantial increase in student numbers. It is pertinent to note that readings on these shows alarmingly 10% increase each year and both over the target levels in 2018. The council has delayed the publication of air quality report for Coventry seeking to use fiddle factors to adjust the already obtain data. The fiddle factors arise from the diffusion tubes used to measure NOs. These tubes are useful low-cost method for indicative monitoring of ambient nitrogen dioxide (NO₂) concentrations only and do not provide a means of measuring fine Particulate Matter. It is mandatory for the councils to monitor the levels of these matters.

It is pertinent to point out that the diffusion tubes are affected by several sources of errors (●the laboratory preparing and analysing the tubes ● the exposure interval – weekly, fortnightly or monthly ● the time of year ● the exposure setting – sheltered or exposed ● the exposure location – roadside or background ● the tube preparation method ● the exposure concentration and NO₂/NO_x ratio) which can cause substantial under and often not overestimation compared to the chemiluminescent analyser which are the European recommended method. I have informed the Council of the inadequacy of diffusion tube methods. I believe Defra may let Councils adapt the 'combined bias adjustment factor' which is far less accurate than the WHO and EU recommended chemiluminescent analysers. I strongly recommend regular calibration of the diffusion tubes by using more accurate means of measurement.

Furthermore, the issue is that although daily readings should be taken, and the tubes should be changed sooner than current practice of 5 weeks. Considering that these tubes clog up within two to three weeks and the chemical used loses its effectiveness soon after, the readings continue to be take irrespective, hence making the average readings much lower. It is pertinent to point out that these tubes are at least adversely 25% inaccurate. Furthermore, allowing NO₂ to exceed 18 times/year and PM₁₀ 35times/year is also a cause for concern. To the best of my knowledge there are no meaningful measurements of PM_{2.5} throughout the City. Furthermore, the catalysts of almost all cars leaving the University during the rush hour are not operational and make the situation/readings much worse.

Please note that the only pollutant measured in Coventry is currently NO₂ in busy streets where people may spend 1-hour or more close to traffic and in narrow congested streets with residential properties close to kerb. In my view, if we are serious about our citizens' health then there should be measuring devices all over the City and around the both universities. The effectiveness of these devices should be verified on regular basis by mobile and more accurate instruments.

The UK Government, according to WHO and EU has failed to protect us and even accepting the practice, the level of pollution in most areas in Coventry is over the target levels; to this end no more

buildings should be constructed around places such Holy Road or the University until the levels of pollutants fall well below the target levels.

I do realise that we as citizens have a role to play and should support our Government to cope with its responsibility and support it in incorporating WHO guidelines and assist it to address the EU's concerns. The challenge in reducing emissions of pollutants in the air cannot effectively be encountered without encouraging more Engineers to enter politics. Most of our MPs and Councillors come from a background in economics, law or politics and some have now technical qualifications. We also need to encourage more young people to champion environmental issues and learn more about them.

My teams, in various stages in the last 40 years have worked round the clock to make engines more efficient and less pollutant. We designed the first hybrid car and bus in Europe and reduced emissions from these engines to minimum. There are new ways to reduce NO2 and PMs significantly; while these efforts are continuing we should be brave enough and raise our concerns and help the Council not to add to the challenges we are currently facing.

The drastic solutions such working from home and using readily available teleconferencing or reducing the number of working days are not that difficult to implement if discussions is encourage among people involved. Use of flettner cylinders on board ships and some buildings have proven to be immensely beneficial. New solar panels and turbines are proving to have a greater role in providing us with green energy. Encouraging electric cars without investing in green energies will not help to solve the pollution problems albeit would hope the cities and towns to have a cleaner air.

Let me end this foreword by stating what we could do in short term. The first thing to do is install diffusion tube around identified pollution hotspots and make sure there are at least one station with both a diffusion tube as well as a more accurate measurement device so that the reading from diffusion tubes are calibrated on a continuous basis. The councils should also immediately install PMs measuring devised in several key areas in cities and towns in the region. **We also need to establish an independent centre with a full-time secretary and a full-time pollution specialist to monitor and support the local councils on air pollution. C4FF is willing to part fund this centre.**

The references used in drafting this foreword were taken from the WHO and the BHF as well as several reports by the Guardian Newspaper. The key UK government report is presented at: <https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf> and proof that Coventry Air Quality has breached the UK own targets can be found at: http://www.coventry.gov.uk/info/68/pollution/171/air_quality.

The Air We Breathe In – how it affects us

To mark the UNICEF Air Quality day a reception was held at Berkeley House on 20th June 2019 followed by a Seminar held at Coventry University on Friday 21st June 2019. Those present at the Seminar were:

| | | |
|----------------------|--------------------|----------------------------|
| Alan Marshall | Hellen Ruby | Peter Jones |
| Angela Fryer | Henry Biddington | Peter Maddock |
| Anita Dalton | Dr Humberto Medina | Pip Pountney |
| Ann Bush | Ian McDermott | Professor John Flower John |
| Ann Wilson | Jim Foster | Jones |
| Anthony Buckley | Joanna Niedzwiedz | Professor Reza Ziarati |
| Cllr Gary Ridley | John Seddon | Professor Robert Shanks |
| Cllr Jaswant Birdi | John Whittall | Rong Lan |
| Cllr Sidney Syson | Lakhvir Singh | Susan Rasmussen |
| Cllr Tarlochan Jandu | Mary Buckley | Dr Svetlana Aleksandrova |
| David Gibson | 'Merle Gering' | Sylvia Martin |
| David Varley | Mostafiz Rahman | Tony Dalton |
| Dr Habib Kashi | Dr Nadia Inglis | Zena Ziarati |

Professor Dr Reza Ziarati opened proceedings explaining the importance of the air we breathe and how important air quality is to human life.

He stated that the main aims of the conference are to:

- understand what we are currently measuring and consider its adequacy
- communicate the above understanding to the widest possible audience
- share the evidence based on the health and social impacts of Poor Air Quality
- share good practice in improving air quality
- understand the likely impacts of poor Air Quality on cities such as Coventry and towns like Leamington Spa (awareness that air quality does not differentiate administrative boundaries)
- consider possible ways to mitigate against poor Air Quality
- agree next steps towards cleaner Local Air

I believe we should involve young people from the schools to future conferences and develop a plan to involve them. After all they are our new generation and our efforts should be to deliver an environment for them at least as good as what our parents' generation left for us. For this reason we produced our first assignment for schools providing g reading materials with quizzes and prizes and hope that this initiative would help our next generation to become more engaged in helping to save our planet and hence start to understand the challenges before them.

In this conference we hope to gather strength by inviting those attending to become a member of our Regional Air Quality group and involve Engineering and other related professional institutions as well as industry and Academia in our work. All local MPs, Cllrs, academicians and medical specialists who were contacted showed a great interest in our project.

The change in climate is a slow one and hence as a result people do not feel the sense of urgency. But once they know that some 1000 1000 1000 1000 kilos of CO₂ is emitted into our atmosphere from ships alone which counts for 2.5-3% of overall CO₂ emission from transportation and that similar amount of other toxic gases, such as Oxides of Nitrogen, are emitted into, then it is easy to digest the damage done. We have not even begun to seriously measure Particular Matters (PMs) which are even more devastating than other toxins, let alone measuring their emissions in cities like Coventry. There are lots of talks about capturing carbon and often oceans are seen as one source of their capture but Carbon capture in our seas is not the solution as carbonic acid is highly unstable and once the seas are saturated

with it, they will return it back to the atmosphere. Electric cars while a solution for improving air quality in urban areas are not a solution for preserving our environment in the future. Reduction in diesel car sales and increase in Petrol cars is certainly not good news as petrol cars are not as efficient as Diesel and produce more CO₂. To reduce Diesels emission we need serious investment into Exhaust Catalysts and Quantum Physics research.

I will be making a presentation later today and intend to propose some short and medium to long term solutions based on our recent research on air quality management in several cities/countries. However, I was disappointed to note that even a moderate and workable short term solution of clean Air Zone in Birmingham had to be delayed with an uncertain future.

Key Objective: Tackling air pollution should be enshrined as a main objective of future infrastructure plans in the future local and national Government reviews

Key priorities for Coventry

- Allowing odd number plates into pollution spot areas in the City every other day and even numbers on other days.
- More diffusion tubes in identified trouble spots and in several other locations for a set of more accurate measuring system to use for calibration of diffusion tubes.
- Several sites for measuring Particular Matters 10 and 2.5.
- Establishment of an independent monitoring office with an administrator and a researcher.
- Development of mono rails between magnet infrastructures such as universities and city centres
- Using local tax-setting to include pool-funding with neighbouring strategic authorities.
- Raising funds - Council tax as well as new levies such as payroll and tourism taxes, the latter is common in many countries
- Aiming for shorter working week
- Encouraging organisations to allow employees to work at home for half of their working week
- Encouraging car sharing.
- More effort in developing brown sites in areas that are not pollution trouble spots
- Encouraging the development of novel means of transfer and transformation of energy such as use of flatter cylinders, Delta rotors, novel solar parabolic systems, use of geothermal heat and so forth.
- More research into Selective Catalytic Reduction systems and Quantum Physics.
- Develop schemes to particularly young people to get involved in initiatives to improve air quality

Emails supporting the importance of the seminar were read out from:

Alan Day - Leader of Warwick District Council
Andy Street – West Midlands Mayor
Michael Gove – Secretary of State for the Environment
Jeremy Wright – Secretary of State for Digital, Culture, Media and Sport
Jim Cunningham - MP for Coventry South
Theresa May – The Prime Minister

Council's Efforts in Improving Air Quality

Session Chaired by Peter Maddock

John Seddon, Head of Transport and Innovation, Coventry City Council told us

- Transport Network is primary used by people going about their daily lives.

- Therefore, we need to find a way for people to live closer to their work, so they don't need to use their cars.
- It does work, as when Coventry's council offices were moved closer to station those commuting to the offices by train rose from 4% to 15% increase and didn't use their cars.
- We need to increase the use of electric vehicles.
- Electric charging points, when operational will need to be fast charging points
- With the introduction of electric buses, we were told that there will be solar panels on the roof of the bus stations, so they will become carbon neutral. Putting into the grid during the day and taking out in the night.

Dr Nadia Inglis, Public Health consultant Coventry City Council/Warwickshire County Council told us

- The key to the problem was to identify the polluters, which are not people but machines.
- We all know about NOx, but I did not realise the danger and effects of Particulate Matter (PM).
- PM is a widespread air pollutant, consisting of a mixture of solid and liquid particles suspended in the air.
- Our health can be damaged due to the mass concentration of PM which have a diameter of less than 10 μm (PM10) and with a diameter of less than 2.5 μm (PM2.5).
- PM2.5, is ultrafine particles having a diameter of less than 0.1 μm .
- PM can remain in the atmosphere for days or weeks and thus be subject to long-range transboundary transport in the air.
- The problem with PM2.5 is that it comes from among other things car tyres.
- Electric vehicles won't help this, unless they have metal wheels!
- The thing that amazes me is that as PM comes from cars and their tyres, so, why can't we incentivise the car or tyre manufactures to sort this.

She went on to talk about an Air Quality plan for developers but questioned its effect.

Henry Biddington, Principal Environmental Health Officer, Rugby Borough Council

- They have been trying to monitor PM and currently have no data.
- Explained that the current Local plan has included air quality concerns.
- The problem is that it is the most deprived areas have worst air quality.
- Why, because they have, for example, the oldest cars and their houses are much closer together, so the pollution stays longer.

Emissions and Air Quality Measurement

Session chaired by Dr Svetlana Aleksandrova/Professor Steve Benjamin

Jim Foster

- Air pollution Chemicals that affect us.
- Pollution is now a major cause of dementia.
- He then explained the difficulties of measuring air quality along with the changes needed.

Professor Reza Ziarati

- There are not sufficient number of diffusion tubes in Coventry
- The diffusion tubes are not very accurate hence another more accurate measuring system should be installed for calibration of diffusion tubes.

- The reading from these tubes in Coventry shows that level of NO₂ increase year-on-year by some 8% on average.
- There has been an attempt to use correction factors to reduce the reading from the diffusion tube in cities such as Coventry. The intention and reasons need to be clarified.
- There seems to be a correlation between the NO₂ levels and admissions to hospitals for respiratory illnesses. This is serious and needs to be investigated.
- It is a known fact that NO₂ emission from an engine increases as combustion becomes more efficient.
- There seems to be a correlation between NO₂ and Particular Matters.
- Particular Matters PM10 and PM2,5 should be measured in the cities and towns in the region.
- C4FF has been working on clean engines and was the initiator of the first hybrid bus and car in the UK. The expertise can be used to help local councils to improve air quality.

Session Discussions

Chaired by Dr Humberto Medina

Panel Discussion

Chaired by Dr Professor Dr Reza Ziarati

- The Professor talked about the dumping of waste by ships in the sea and his hope that with satellite technology this could be reduced
- He reminded us the pollution knew no borders, pollution in Hamburg could easily come to us.
- It was agreed that it is a worldwide problem that must be tackled globally but needs to start locally.
- To tackle it requires funds, if local government hasn't the funds then central government has to provide them.
- It was agreed that for electric cars to become the norm a proper electric charging infrastructure needs to be in place.
- It appears that Slovenia already has one in place.
- In the meantime, we need to reduce car use.
- One suggestion that only even number plates are allowed to enter the city on one day and odd numbered ones the next. I don't know how you will get widespread support for this.
- To properly measure NO₂ and find out the danger points more diffusion tubes are required, along with the establishment of an independent monitoring office.
- It was emphasised that currently there are not means of accurately calibrating diffusion tubes which are known to be inaccurate. The means of adjusting the readings advised by the government is totally wrong and this has to be addressed so that people are aware of actual reading from these tubes.
- Currently Particular Matters such as PM10 and PM2,5 are not measured in cities like Coventry. It was noted that this problem needs to be addressed urgently.
- Geothermal energy is one area that is not being looked at and could be.
- More wind farms and tidal energy are required.
- An example provided by the Professor was that they are now testing ships with rotating cylinders (flettner) that rotates round a mast and can generate electricity from whichever direction the wind is blowing.

- Professor emphasised the need to educate young people especially school pupils of the importance of the citizens taking responsibility to help the local and central government in improving the quality of air in towns and cities. It was noted that a school project has already been initiated by www.c4ff.co.uk and will be incorporated in the work of STEM initiatives supported by C4FF (www.inspire-group.org).
- There is also a need to plant more trees and plants in pollution hot spots. There are plants that can, apart from producing oxygen, can absorb some of the harmful pollutants. Some categories of trees and plants was reported to produce very little carbon dioxide. It was suggested that people should be encouraged to give eco friendly trees and plants as gifts and this has to become a norm in our societies.
- C4FF was report to have commissioned a series of the reports in cities around the world to identify air quality problems and good practices in improving air quality.
- The meeting felt that there needs to be a concentrated effort in finding none polluting ways to produce electricity

The afternoon - Panel Discussion

Chaired by Professor Dr Reza Ziarati

- A discussion about Hydrogen trains.
- One has been built and operating on a test track. There is a problem, the carriages are full of Hydrogen cylinders where the passengers should be! It needs more work before it becomes viable.
- We learnt the interesting fact, there is less pollution on the centre of New York than in the suburbs, because as people live close to their work, they don't use so many cars.
- Therefore, if we could increase the residences in city centres, could we reduce pollution?
- Basically, we need to find a way eliminate our reasons to travel by making local shops more attractive. We need to walk to the local shops instead of taking a car to an out of town supermarket.
- A discussion followed as to why more freight can't go on rail. There is a branch line into most trading estates, it would reduce pollution quickly and the infrastructure is in place.

Trees

- Just growing trees around schools has been proved to reduce pollution.
- **A Tree for Schools programme** was proposed, where each parent is asked to give a tree to their child's school. It was suggest by Professor Ziarati that we should encourage people to give trees as gifts rather other presents and make this a cultural custom.
- Pressure should be put on Education Authorities to grow more trees around schools.
- The benefits of this are shown by China – after the Beijing Olympics the authorities planted 1B trees, the smog has now gone. They say.

Conclusions and Recommendations for Future Work

Alan Marshal summed up things that came out of the day's discussions.

- It was felt that the mindset, "freight can't go on rail" should be changed.
- It became obvious that there is no joined up thinking on the whole issue.
- People don't yet realise the dangers, as a result they don't see the importance of doing something about it, therefore there has to be a social media exercise to make them understand.
- Along with an education programme to get everyone together, to understand the importance of air quality.
- There needs to be a campaign to encourage people to walk whenever they can

- About Electric Vehicles:
 - Have we worked out our dependence on rare metals, that currently is only available from one or two places?
 - We have not yet worked out how we dispose of the batteries.

Finally

- The real lesson from today is that there is no joined up thinking on the whole issue, hence the proposal to form a local air quality group composed of all those in attendance.
- There was a suggestion by Professor Ziarati, supported by several others, to form an independent office to monitor air quality in Coventry and Warwickshire to be funded jointly by Government and local community over the next three years.

Air Quality Conference

Coventry University, 21st June 2019

My attendance at this Conference was motivated as a concerned layman wanting to learn something about the real relevance of air-quality and pollution in general. More particularly, I was seeking to learn of the local situation and what action is underway and/or what is being planned concerning future action to at least mitigate the problem. I guess my primary concern is a rather parochial one, but I am intelligent enough to appreciate that this is a world-wide problem. Also, as an engineer with a long time interest in the internal combustion engine, was there anything I can contribute other than to make the situation worse.

I feel that listening to the speakers and to the discussions and questions my appreciation and understanding of the problems involved were considerably enhanced. My regret is that owing to pressing business elsewhere, I had to miss the afternoon session.

My particular desire to learn more was perhaps handicapped by my starting from a low knowledge-base. Judging by some of the contributions from the floor, this was not a handicap the vast majority of attendees were suffering from. The contributions from the floor, I thought, were rather impressive and delivered by some attendees extremely well-versed in the subject.

The wide-ranging introductory presentation, as well as the comments concluding the morning session, was excellently delivered by Professor Reza Ziarati. It is patently obvious that if we have a future, it is to be electric. But generating this electricity has got to be achieved in a reliable, clean and economic way. Here we have to admire (envy?) the Norwegians. Their bulk electric-power generation is almost wholly hydroelectric and always has been. Their infra-structure to deal with handling future demands is robust and it is easily afforded. After all, they have the largest sovereign wealth-fund per capita in the world, somewhat ironically built-up by selling oil and gas overseas. Their internal gas-supply network is minimal. With this situation is it no wonder that their sales of electric automobiles per capita is massive compared to elsewhere in the world. I suggest we have lots to learn from our North European neighbour. More generally, we must abandon this *not-invented-here* phobia that has always, in my lifetime at least, prevailed in England in particular. Sorry, this latter topic is my hobby-horse, or one of them anyway, for years.

I digress.

I would have very much have liked Professor Ziarati's introductory address to have been followed by the presentation of Mr Jim Foster. It would seem to me he had the almost ideal background in this area, firstly as a retired engineer from a relevant industry together with some years' experience as a publicly-elected servant with a constituency to serve. As an exposition of the physical science involved (this cannot be denied) and with an outline at least of the political problems it raises, it was quite superb. The so far, practically-unmeasurable micro-particulates from diesel exhaust present an

extremely worrying issue that he rightly brought to prominence. He seemed also to be well-versed in quite detailed health issues - an expertise not commonly possessed by engineers.

I should have liked to have seen Mr Foster's contribution followed immediately by Ms Nadia Inglis' talk on health issues. This was an impressive presentation and, to me, as a minor hypochondriac-sufferer, concerning indeed. The statistics shown by these two contributors were detailed and frightening. I had some appreciation of the effect of bad-air on lungs, but I was completely ignorant of how damaging this can be to other health issues and serious diseases. It was encouraging to see that immediately the morning session ended Ms Inglis hurried across the room to speak with Mr Foster. I certainly would like to think that was a good omen for all folk living in this vicinity

As an engineer I sat somewhat embarrassed in that I had, in the 1970's, been among those championing the diesel engine as the biggest potential contributor to mitigating the effects brought on by the Arab boycott of the oil supply. So far as automobiles were concerned the worry was not that of pollution but that an overnight swop even if this was at all possible, from petrol to diesel propulsion would be hampered by the lack of diesel-trained mechanics in local garages. I cannot remember any mention of health issues at the time.

Removing diesel-driven cars and lorries from the roads might alleviate the problem at least in the shorter time. However, the diesel engine is easily arguably the most efficient and versatile heat-engine yet invented by man. Indeed, something like 99% of all the world's working marine vessels, ranging from small ferry-boats to giant tankers, are diesel driven. The world's economy would collapse without them. How one replaces such engines is a gigantic headache. The first move is probably using liquid natural gas; some small-scale efforts to start this are underway with engines designed to operate both with diesel and with natural gas. What success can be achieved economically by modifying in-service engines in this respect seems to be a moot point among developers.

The contributions from local authority representative were detailed and informative, and nice to see some considerable activity underway. Somehow these contributions were more reassuring than rousing in comparison to those mentioned above. Perhaps this is not surprising considering these are local officials being circumscribed by laws and directives from central bodies as well as having to please their local political masters. So my impression I got was that they were competent managers of the tasks they had been given, but having some difficulty pushing the boundaries, so-to-speak.

Professor Ziarati in the morning's summing-up made the excellent point that if one is to do worthwhile surveys that stand-up to scrutiny, they must be carried out using properly calibrated instruments at the precise place from which knowledge is sought, and at the right time. I might add that it is also desirable to measure the weather conditions pertaining at the time. Like gathering any data for statistical analysis, the conditions under which they are taken must be known if any real confidence depending on them is to be confidently placed; scrupulous background data is often difficult if not impossible to achieve, if this is the case then such difficulties must be documented as

part of final statistical-assessment. Otherwise, those with vested interests that do not support where the statistics are pointing, will queer the path with usual 'statistics-and-damn-lies' taunts, or more fashionable 'fake news' rubbishing.

For me this was an eye-opening event - time well invested. My understanding is that the proceeding of the conference will be published, and I hope that I shall receive a copy soonest.

John Flower

24th June 2019

Letters of Support for the Air Quality Conference at Coventry University on 21st June 2019

Rt Hon Theresa May - The Prime Minister. The Prime Minister was pleased to read that the conference was being held to mark UNICEF's Air Quality day and that the aim was to bring together interested bodies to find medium and long-term solutions to improve air quality in our towns and cities. Whilst the Prime Minister was unable to attend, she sent best wishes for the event's success and hoped that the continued work would improve air quality in the United Kingdom.

Andrew Day, Leader of Warwick District Council, was unable to attend but wished the organising committee every success and hoped that another opportunity would arise to engage with the work being done in the future.

Andy Street, Mayor of the West Midlands, was also unable to attend due to prior commitments, but thought the event was a great occasion to discuss this important issue.

Rt Hon Michael Gove, Secretary of State for the Environment, was unable to attend due to an extremely busy schedule, but appreciated the invitation, and wished the event every success.

Rt Hon Jeremy Wright, Member of parliament for Kenilworth and Southam, was unable to attend but hoped that the event went well.

Jim Cunningham, Member of Parliament for Coventry South, was unable to attend but wrote a long email saying that he valued the first-hand experience that the Professor had, having given up cycling due to the air quality in the city. He said he was deeply concerned that the Government had failed to tackle air pollution which was responsible for 40,000 deaths a year across the UK, according to the Royal college of Physicians. He also said that the costs associated with this and other health issues directly resulting from air quality problems is estimated to cost the UK economy around £20 billion each year.

He also mentioned that he had stood on a manifesto that committed to ensure that 60% of our energy comes from zero-carbon or renewable sources by 2030. He also pledged to improve energy efficiency, to ban fracking and to deliver an industrial strategy that invests in renewable energy.

He felt that we must protect the green belt and prioritise brownfield sites while acknowledging that building new homes was important. He felt that the Government's planning reforms have failed to promote brownfield development and the Government wants to deliver housing numbers at any cost.

He finished by assuring that the health of local residents was of paramount importance and would be closely following the development of future building work, especially the expansion at Warwick University. He would like to be kept in touch.