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The University of the West of England, Bristol
Marking 60 Years of the Clean Air Acts
EPUK AGM 11th February 2016

60 Years of Health Protection under the Clean Air Acts

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Structure of Presentation

• 2016 marks 60 years of UK Clean Air Acts.
• This presentation explores the challenges, opportunities and progress since the Clean Air Act, 1956.
• It reflects upon historical attempts to manage air pollution noting success factors and barriers to progress.
• Particular attention is given to the impact of the 1952 Great Smog and the role of National Smoke Abatement Society, the forerunner of Environmental Protection UK, in creating the momentum for the 1956 Act.
• The presentation concludes with a review of the contemporary air pollution challenge and the weakness of the governmental and societal response to the national and global public health challenge.
Air Pollution in London

• A long history of emissions and high concentrations interacting with the topography of the city to create short and long-term public health impacts.
• A history of somewhat half-hearted attempts over time to note and report but not act with sufficient vigour to improve air quality.
London 13th – 16th Century

- In 1285 a commission was established to investigate the pollution from coal burning in London.
- In 1306 a Royal Proclamation prohibits the burning of sea coals by craftsmen. This was directed at coal combustion in lime kilns and by smiths, bakers, dyers, brick makers, glassmakers, brewers, salt and soap boilers and in furnaces. It is said that one offending craftsman was executed for disobeying the proclamation. There is no documentary evidence to support this.
- In 1547 Queen Elizabeth is “greatly grieved and annoyed with the taste and smoke of sea coals”.

Ref: Brimblecombe, P (1987) the Big Smoke, Routledge. pp185
17th Century Britain

- In 1603 Hugh Platt proposed that smoke from burning coal caused damage to plants and to buildings in London.
- By now coal burning is widespread in London (and other cities) as a source of fuel in industry and becoming a source of heat in homes.
- In 1648 Londoners’ petitioned parliament to prohibit the import of coals from Newcastle because of the injuries experienced.
- After complaints from a neighbour a baker was ordered to erect a chimney “so high as to convey the smoake clear of the topps of the houses.”
- The first tall chimney to dilute and disperse pollution?
- Ref: Brimblecombe, P (1987) the Big Smoke, Routledge. pp185
John Evelyn

In 1659 John Evelyn described the smoke of London as

“Such a cloud of sea coal as if there be a resemblance of hell upon earth, it is in this volcano in a foggy day: this persistent smoak which corrodes the very yron and spoils all the moveables, leaving a soot on all things that it lights and so fatally seizing on the lungs of the inhabitants, that cough and consumption spare no man.”

From: J. Evelyn A Character of England, 1659
“That this Glorious and Antient City, should wrap her stately head in Clouds of Smoake and Sulphur, so full of Stink and Darknesse, I deplore with just Indignation.”

John Evelyn
1661

John Evelyn

London’s "inhabitants breathe nothing but an impure and thick mist, accompanied with a fuliginous and filthy vapour, .... corrupting the lungs and disordering the entire habit of their bodies ..."

_Fumifugium, 1661_
John Evelyn

• By the middle of the 17th century Evelyn had identified three key principles of pollution control:
  – Smokeless fuels,
  – Fuel substitution and
  – Separation of polluting source from receptors
• Evelyn’s analysis of air pollution is holistic in its consideration of sources, impacts and potential solutions.
• Evelyn’s analysis of air quality management was rarely applied in the next 300 years.
John Evelyn

• In 1661 King Charles II commanded Evelyn to prepare a bill to place before parliament to remove the smokey trades from the city of London.

• Although drawn up in 1662 this bill was never presented to parliament.

• It must be presumed that vested interests had petitioned the king or officers of parliament to this effect.

• This would not be the last time that vested interests would prevent legislation being enacted, or failing that, weaken its impact or scope and minimise its enforcement.

• Ref: Brimblecombe, P (1987) the Big Smoke, Routledge. pp185
The 19th Century

- Throughout the latter part of the 17th and 18th centuries London experienced a widespread air pollution problem.
- Information on the causes, impacts and solutions was available to the powers of the day but effective action was not taken.
- In the 1820s an MP, M. Taylor, complained that the smoke in Whitehall is as bad as in Evelyn's day and attempted to introduce legislation. He noted that “the volumes of smoke which issue from the furnaces on every side of the river Thames opposite my house actually blacken every flower in my own garden in Whitehall”.
- By the 1820s the use of the steam engine in industry had led to much greater rates of coal consumption than hitherto.
- Domestic coal consumption for heating and cooking was also much increased.
- Ref: Brimblecombe, P (1987) the Big Smoke, Routledge. pp185
The 19th Century

• The poor quality of the urban atmosphere can be seen from the lithograph of an industrial northern town from the middle of the 19th century. Numerous chimneys belch forth smoke, smoke blackened houses sit next to factories, the river is a source of drinking water and a foul sewer for industrial and domestic wastes.

• In 1843 the McKinnon committee was established to examine the prevention of nuisance from smoke arising from fires and furnaces which led indirectly to the 1853 *Smoke Nuisance Abatement (Metropolis) Act*.

• The Act addressed industrial sources of smoke but not the problem of domestic coal combustion.

• By the later part of the 19th century the pattern of smog (smoke plus fog) more closely followed the pattern of domestic coal combustion than that of industrial combustion.

• Ref: Brimblecombe, P (1987) the Big Smoke, Routledge. pp185
Staffordshire, 1850
Sheffield, Late 19th Century
The Role of Interest and Pressure Groups

- The Noxious Vapours Abatement Association was formed in Salford in the late 19th century and later became the Smoke Abatement Society.
- In 1898 the Coal Smoke Abatement Society was formed in London.
- In 1909 the various smoke abatement societies based in northern cities joined together to form the Smoke Abatement League of Great Britain, based in Manchester.
- 1929 the National Smoke Abatement Society was formed from merger of Manchester and London societies.
- The National Smoke Abatement Society is the predecessor of the National Society for Clean Air and Environmental Protection-UK.

Ref: NSCA (1998) Clearing the Air. 100 Years of the National Society for Clean Air and Environmental Protection. NSCA, Brighton.
Fresh Air from the Potteries

http://www.staffspasttrack.org.uk/exhibit/coal/historical%20overview/pottery.htm
Manchester and Salford Smog of 1931.

- In January 1931 Manchester and Salford were engulfed in a severe smog that persisted for 9 days. In total 592 deaths from respiratory disease occurred during these 9 days.
- A rate of 66 deaths per day. 30 times the rate in December.
- An early warning ignored.

Manchester Ship Canal in Smog.
The London Smog of 1952

- On Friday December 5th 1952 an unusually severe fog descended upon London as a slow moving anticyclone came to a halt over the city.
- On Friday morning the fog was the thickest in living memory. It grew thicker throughout the day and people began to experience discomfort in breathing.
- Those outside rapidly became smoke blackened and aware of the choking smell.
- That evening respiratory cases, especially bronchitis, were twice the normal rate. Some million chimneys added more smoke to the fog.

Ref: Brimblecombe, P (1987) the Big Smoke, Routledge. pp185
Protection against smog?
The London Smog of 1952

- On Saturday visibility was near zero, prize animals at Smithfield show took ill and some had to be destroyed.
- At Sadler’s Wells an opera performance had to be stopped due to poor visibility in the theatre. People continued to suffer health effects.
- On December 8th the fog was as thick as ever, respiratory problems continued to be reported. Transport was at a complete standstill.
- The fog cleared by the 10th of December as the anticyclone moved away.
- It is estimated that 4000 excess deaths were caused by the smog.
- The number of deaths has subsequently been a subject of some debate with 12000 excess deaths and some 100000 cases of respiratory illness being suggested.
- Recent work in Thorax by Hansell et al (2016) * suggests that exposure to high air pollution concentrations carries a long term risk to health
  - Ref: Brimblecombe, P (1987) the Big Smoke, Routledge. pp185
The Great Smog As Catastrophe

- The smog of 1952 was a catastrophe with a very high increase in respiratory mortality and morbidity. As is often the case in environmental matters it was the acute impact that was the catalyst for legislation.

- Why a catastrophe was necessary for action to be taken? The sources, impacts and controls were well known before the 1952 smog, indeed had in part been known since Evelyn’s day.

- Indifference? Cost?

- What is clear is that mitigating the public health impact was not afforded a sufficiently high priority.

- What is often overlooked is that prolonged exposure to high winter time concentrations of smoke reduced the quality of life, causing illness for many and brought an early death to many more.

- The total of deaths foreshortened through the winter time smogs far outweighs the deaths caused by the 1952 smog but they were not enough to bring effective change. That required a catastrophe.
The Beaver Committee

- In 1953 the Beaver Committee was established to “examine the nature, causes and effects of air pollution and the efficacy of present preventative measures; to consider what further measures are practicable; and to make recommendations for action by government.”
- The report recommended action on domestic smoke and the effective use of fuel in industry.
- The Beaver Committee estimated the cost of air pollution in 1954 as £250million.
- The Beaver Committee’s recommendations were neither novel nor new and had been promoted by the NSAS for some time but they catalysed the government into action.
- The recommendations suggested the clearance of the log jam of obsolete laws and administrative practices and created a policy framework for clean air, an act to cover domestic and industrial emissions of smoke from new and existing premises.

Ref: Sanderson (1961) Political Studies 9 (3) 236-253
Smoke Abatement Legislation

- Prior to the 1956 Act the law on air pollution was determined by the Public Health Act (1875) and the Public Health (Smoke Abatement) Act 1926.
- According to Sanderson (1961)* these provisions were fragmentary and by the 1950s had been rendered obsolete by technological developments.
- In 1954 NSAS argued for scrapping of existing legislation and starting again!
- In 1956 this aim was achieved partly because of the 1952 smog, partly because of the Beaver Committee and partly through the actions of Gerald Nabarro MP and the NSAS.

Ref: Sanderson, J.B. (1961) The National Smoke Abatement Society and the Clean Air Act 1956 Political Studies 9 (3) 236-253
NSAS, the Beaver Committee and Nabarro’s Bill

- Three members of the NSAS were appointed to the Beaver Committee
- Dr Burn, Mr Nonhebel and Dr Lessing
- The NSAS Committee Report of 1954 welcomed the Beaver Committee’s Report as “the most authoritative statement on the subject that can be expected”
- 12 MPs from all sides of the House provisionally agreed to introduce a Private Members Bill to take forward the Beaver Committee’s recommendations. Nabarro won first place in the ballot and consulted with the NSAS for assistance with drafting the bill. In addition, the NSAS supported the Bill though meeting the costs of a parliamentary adviser.
- The Guardian described the Nabarro Bill as a “pistol at the Ministers’ backs” which stopped the Beaver Committee report being “filed”.
- Nabarro’s Bill was withdrawn in favour of a Government Bill.

Ref: Sanderson, J.B. (1961) The National Smoke Abatement Society and the Clean Air Act 1956 Political Studies 9 (3) 236-253
Parliamentary Development of the Act

- The Government introduced a Bill after the 1955 election.
- NSAS supported Nabarro and others in their scrutiny of the Bill.
- Several MPs saw vested interests at work in the limited provisions put forward in the Government’s Bill.
- The Committee Stages of the Bill allowed the NSAS to help MPs to move amendments and circulate criticisms of the Bill.
- Further amendments to the Bill were introduced in the Lords by sympathetic peers and when finally passed the Society described the Act as “the most important administrative step forward in the prevention of air pollution since the Public Health Act of 1875”.

The specific actions required by the Clean Air Act were detailed in memoranda containing the detailed requirements of e.g. smoke control zones.

Ref: Sanderson, J.B. (1961) The National Smoke Abatement Society and the Clean Air Act 1956 Political Studies 9 (3) 236-253
The Clean Air Act, 1956

- The Act, in direct response to public outrage at the catastrophic smog of 1952, banned dark smoke emissions from chimneys, railway engines and vessels, required new furnaces to be smokeless, required the emissions of grit and dust from furnaces to be minimised, and gave local council’s powers to introduce smokeless zones.
- In between the recommendations of the Beaver Committee and the act many concessions had been made to vested interests but at last the smokeless zone had become a national policy.
- The NSAS has a very honourable place in the fight to achieve the Clean Air Act which helped the UK achieve a world leading position in the battle against air pollution.
- Can we say that today?
The Clean Air Acts

• The 1956 Act was later amended and extended by the *Clean Air Act, 1968*. The 1956 and 1968 Acts were consolidated and their key provisions re-enacted in the *Clean Air Act, 1993*.

• The 1956 and 1968 Acts constituted the operative legislation against pollution by smoke, grit and dust from domestic fires and other commercial and industrial processes not covered by the Alkali Acts and other subsequent legislation.

• They regulated the combustion of solid, liquid and gaseous fuels and controlled the heights of new industrial chimneys that are not scheduled elsewhere.

• The Acts prohibited the emission of dark smoke from any chimney, provided for government funding for the conversion of domestic grates to smokeless operation, and regulated the fuels that could be burnt on them.
The Clean Air Acts

- The Clean Air Acts dealt with visible pollution especially smoke. They had a dramatic effect in reducing the concentration of visible black smoke particles in the air.
- In Manchester the annual mean concentrations of smoke fell by some 90% between 1959 and 1984. The bronchitic death rate - an indicator of the health effect of air pollution - reduced in line with the concentration of smoke.
- The Clean Air Acts cleared the air but did not clean the air of all pollutants. The Acts did not specifically target sulphur dioxide or fine particles and although substantial reductions in annual mean concentrations did occur, this was a by product of other processes set in train by the acts.

The Clean Air Acts

• The emphasis on visible pollutants was appropriate at the time the Acts came into statute. Their success was due to the focus on one fuel - coal - and on the emission of black smoke. Their success bred complacency and fostered a view that urban air pollution had been conquered.

• Black smoke had been dealt with but the problem of gaseous pollutants and fine particles would return later as the location of sources, the intensity of the sources of emission and the composition of air pollution changed.

• Concentrations of pollutants regulated by the Acts fell whilst those from motor vehicles increased substantially in the period from 1985 onwards.
A New Form of Pollution
History Is Forgotten

• Elimination of “pea soupers” created a prevailing ideology that air pollution had been conquered.
• Resources were directed towards other problems and the onset of health based concerns about the impacts of the growth of road traffic in the 1980s and 1990s left the UK woefully ill prepared to tackle an emergent problem.
Point sources still an issue – Durban South Africa
Beijing playground 2013

Photo by Anna Scannell
Beijing school playground on a “no play outside” smog day 2013

Photo by Anna Scannell
It is a major problem in the UK too

- Air pollution is a serious and long standing problem here, now, in our major cities.
Air pollution is still a grave problem

• 64% (257) UK Local Authorities declared AQMAs, primarily for NO$_2$ and PM10 from traffic (2014).

• In 2013, the UK exceeded the EU limit value for nitrogen dioxide (NO$_2$) annual mean at 31 of its 43 zones and agglomerations (38 excluding the Margin of Tolerance).

• Current government predictions are that full compliance will not be achieved until 2025.
Air pollution is still a cause of death

• In the UK about 29000 deaths per year are associated with exposure to fine particles, less than 2.5mm in diameter (PM2.5). This is about 6% of total deaths.
• In cities PM2.5 primarily comes from cars, lorries and buses but they are also produced by the burning of wood, heating oil or coal for domestic or industrial purposes.
• In Europe, the WHO estimates about 500,000 people die prematurely as a result of air pollution every year.
• These estimates do not include any contribution from NO₂.
Committee on the Medical Effects of Air Pollutants (COMEAP)

It is estimated that the effects of NO$_2$ on mortality are equivalent to 23,500 deaths annually in the UK. Many of the sources of NOx (NO$_2$ and NO) are also sources of particulate matter (PM). The combined impact of these two pollutants is equivalent to more than 52000 deaths per year and represents a significant public health challenge.

Air Pollution Deaths in London

- King's College London 2015 report* on the mortality burden of NO$_2$ and PM2.5 suggests that nearly 9,500 people die early each year in London due to long-term exposure to air pollution, more than twice as many as previously thought.

WHO

• WHO reports that in 2012 around 7 million people died—one in eight of total global deaths— as a result of air pollution exposure either indoors or outdoors. Globally, 3.7 million deaths were attributable to ambient air pollution.

• This finding more than doubles previous estimates and confirms that air pollution is now the “world’s largest single environmental health risk”.

• Reducing air pollution could save millions of lives.

• Ref: http://www.who.int/phe/health_topics/outdoorair/databases/en/
WHO

- The new figures suggest that outdoor pollution from traffic fumes and coal-burning, and indoor pollution from wood and coal stoves, kills more people than smoking, road deaths and diabetes combined.
Around 80% of the 3.7 million deaths from outdoor pollution came as a result of stroke and heart disease, 11% from lung diseases and 6% from cancers. The vast majority were in Asia, with 180,000 in the Americas and Europe combined according to the WHO.
Costs in context

• WHO estimates air pollution costs European economies US$ 1.6 trillion a year in diseases and deaths.
• UK national debt about US$ 2.55 trillion.
• Greek debt US$ 422 billion.
• WHO study. Cost corresponds to the amount societies are willing to pay to avoid these deaths and diseases with necessary interventions. In these calculations, a value is attached to each death and disease, independent of the age of the person and which varies according to the national economic context.

WHO

• New and emerging epidemiological studies have also revealed that the main health effect of air pollution is cardiovascular (heart disease and stroke) and that ambient air pollution is now a Class 1 carcinogen, equivalent to tobacco smoke.

Supreme Court Judgment

• In April 2015 the Supreme Court ruled that the UK is in breach of the European Air Quality Directive, and insisted that the government draw up a plan for compliance by the end of this year.
Air Quality Strategy, 2000

• “Clean air is an essential ingredient of a good quality of life. People have the right to expect that the air they breathe will not harm them”
A Right to Clean Air?

- European Court of Justice 25/7/08
- The Judgment of the Court (Second Chamber) confirmed the enforceable “Right to clean air” for all EU citizens.
- Entitlement of a third party whose health is impaired to have an action plan drawn up as provided for by the Directive, where that third party is entitled under national law to bring legal proceedings for measures to prevent the value limits of particulate matter being exceeded
New Defra Air Quality Plan

Improving air quality in the UK
Tackling nitrogen dioxide in our towns and cities
UK overview document
Defra, London,
December 2015

Available at:
The Clean Air Zone

- Defra proposes that selected Local Authorities create Clean Air Zones.
- By 2020 the most polluting diesel vehicles - old polluting buses, coaches, taxis and lorries - will be discouraged from entering the centres of Birmingham, Leeds, Southampton, Nottingham and Derby.
- Birmingham and Leeds will also discourage old diesel vans and implement other measures including park and ride schemes, signage, changes in road layouts and provision of infrastructure for alternative fuels.
- London’s strategy for improving air quality by 2025, includes the implementation of an ultra-low emission zone by 2020, retro-fitting of buses and licensing new taxis to be zero emission capable from 2018.
- No new money nor new powers are offered.
- Is this adequate?
Clean Air Act

• The UK Government and Devolved Administrations are reviewing the Clean Air Act to ensure that it continues to be effective in tackling air quality challenges and in particular will take account of source control measures under the Ecodesign Regulations and the Medium Combustion Plant Directive.

• In England Ministers have also consolidated a number of regulations under the Act to streamline the regulatory burdens placed on businesses and local authorities.
Public and media attention

- Public and media attention has also been captured, in part by the WHO’s figures and the increasingly common spectacle of visible photochemical smog as depicted in Chai Jing’s viral ‘Under the Dome’ documentary, which is providing its own solution to the “invisible” air pollution problem.

VW Diesel Scandal

- VW Group’s criminal actions.
- Deliberately setting out to deceive the US EPA and EU and in so doing harming public health.
- Implications will rumble for a long time and will, I suggest, be a catalyst for change unless the reformulation of the issue as a consumer issue drowns out the public health argument.
A Choice

• We choose air pollution through our behaviours and social practices.
• For those least able to exercise choice air pollution is imposed.
• We can choose to minimise the effects of air pollution.
• Do we want to change?
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