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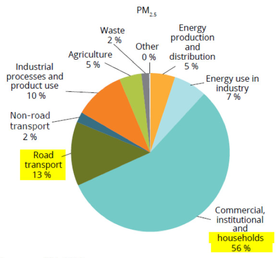
Air pollution: numbers and doubt

Much has been written on air pollution and its health impacts, especially following the Volkswagen Diesel scandal and the new trendy enviro fashion of Diesel bashing. In this blog, I will make a few comments on the contribution of household wood burning, on the fluency of reference values and the extraordinary statistics of air pollution caused mortality. As a long time asthma sufferer I appreciate clean air above all; this does not give me license to take the hysteria train and to throw away all principles of scientific thinking.

1. **The climate-friendly wood burning**

In a previous comment I showed that residential wood burning is a big contributor to PMx fine dust particles (PM10 and PM2.5) pollution. The 2016 air quality report of the EEA confirms this with the following picture:

Figure 3.1 $PM_{2.5}$ emissions in the EU-28: share by sector group in 2014



Source: EEA, 2016c.

Clearly the contribution of road transport is minuscule compared to that from wood burning; curiously it is the former that you find mentioned as a culprit in nearly all media articles, and the latter that is most often conveniently ignored. The percentage of 56% may well be too low as the EEA report mentions a new study that finds that *"the residential wood combustion emissions (are) higher than those in previous inventories by a factor of two to three…"*

Residential wood burning has been pushed by the "climate-friendly" agenda without any pause for clear thinking. As so oft when feelings dominate over intellect, the unintended consequences are spectacular!

2. The crux of the reference values

When you qualify a gas as a pollutant, it is important to know what the natural background values are. These values haven been christened "counterfactual concentrations C0" in the new EEA report. Curiously, this natural background has often been ignored, so that health related effects start with an impossible 0 concentration. This was the case for PM2.5, until the 2017 (preliminary) air quality report conceded that nothing (or not much) is known about the danger of levels lower than 2.5 ug/m3, so that this new level diminished the attributed mortality by a whooping 18%.
The same problem exists for many other pollutants: natural ozone concentrations may locally be much higher, and introducing a unique EU-wide lower threshold automatically pushes meridional sunny countries into the club of the sinners. The report candidly acknowledges this by *" O3 concentrations show a clear increase as one moves from the northern parts to the southern parts of Europe, with the highest concentrations in some Mediterranean counties and in summer time"*.

3. The extravagant mortality numbers

400000 people killed by air pollution in Europe, 40000 deaths in the UK…. These are numbers repeated at nauseam by the copy/paste media without any clear reflection on their validity.

By digging deep, one nevertheless can find some clearer thinking. Let us start by a "**factcheck**" article by Greenpeace (yes!) titled "Are there really 40000 air pollution deaths a year?". For instance the article recalls that in the cities where studies have been made on the danger of PM's, values were never lower than 7 ug/m3 and the data do not show any danger coming from values below. Antony Frew, professor in respiratory medicine says that *"the basic data does not say that 40,000 people have died"*.

Another comment comes from the Winston Centre for Risk and Evidence Communication "Does air pollution kill 40000 people each year in the UK?". Here we find the mind blowing statement that *"COMEAP point out, for example, that 60% of the estimated harm in the UK is estimated to occur at levels less than 7 ug/m3 PM, and yet the US data provide no direct evidence of harm at this level"*. (COMEAP = Committee on the Medical Effects of Air Pollution). The report shows this table from COMEAP:

Measure of effect	*Estimate*	*Plausible interval*
'Attributable deaths'	28,811	5,000 to 60,000
Burden on total survival (life-years lost)	340,000	55,000 to 680,000
Average loss in life expectancy:		
For whole population aged 30+: (38,000,000)	3 days	½ to 6 days
For all deaths (600,000)	7 months	1 to 14 months
For deaths from cardiovascular causes (191,000)	2 years	4 months to 4 years
For 'attributable deaths' (29,000)	11.5 years	2 to 23 years
Bronchitis in children 6-12	103,000	
Respiratory admissions to hospital	12,000	
Lost working days	6,000,000	

Table 1. COMEAP's estimated annual impact in UK of man-made PM2.5 pollution (2008 level). Interval has 75% plausibility, based on expert adjustment of statistical interval.

Note the huge plausible interval for the life-years lost: the interval is abyssal, so that an estimate of 340000 borders on the nonsensical. The Winston comment concludes wisely by *"There are huge uncertainties surrounding all the measures of impacts of air pollution, with inadequate knowledge replaced by substantial doses of expert judgement. These uncertainties should be better reflected in the public debates. In addition, the situation in the UK is not what we would usually think of as a 'crisis'."*

4. What a change in a year!

As a last reflection I suggest the very good article by phys.org "NO2 – not as bad as we thought?" The article discusses a new technical report concerning the planned Clean Air Zones in the UK. This report finds that the damages caused by NO2 to the public health is 80% lower than the estimate in a previous report. This previous report assumed that for every 10 ug/m3 PM the mortality risk would increase by 2.5%; now this risk factor is down to 0.92%. When a new report changes the danger level given in a previous one by such an enormous percentage, our politicians would be well advised not to rush into hasty actions, and would wisely wait for things to settle down.

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