



SACRIFICING THE POOR *The Lancet* on 'pollution'

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Foreword

By Lord Donoughue

Foreword Professor Paunio has enjoyed a distinguished career in global public health, both in Europe and the USA. He has a proven record of countering medical falsehoods, based more on environmental propaganda than on scientific evidence. He certainly adds to that reputation in this hard-hitting and evidence-based paper. It focusses on two recent reports published (to its discredit) in the medical journal *The Lancet*. They have been widely quoted in the British Parliament and in the popular media. They were predictably trumpeted by climate alarmists at the 23rd UN Convention on Climate Change, clearly their target political audience.

The reports' conclusions are supportive of the familiar climate-campaign claims that industrial development, and especially pollution derived from coal-fired power generation, are the main cause of much ill health and mortality in the world. Their political purpose is to convince global policy makers to take radical environmental action, for example by regulating and restructuring our energy economy, however inefficiently and expensively, in order to serve the noble cause of saving lives and improving health. There may be a case for that, if based on scientific facts, but Professor Paunio shows that *The Lancet* does not respectably advance that cause.

The Lancet's political activism is apparently part of a wider political environmental campaign to blame almost any issue of current public and media concern on climate change (which is happening and always has): mass migration, floods, droughts, storms (now conveniently named to make a greater impact on public memory), and (allegedly) disappearing animal species such as Al Gore's polar bears – now interestingly at a near peak of population. Professor Paunio writes clinically and factually to demonstrate the errors, exaggerations, distortions, misquotations and suppressions of established evidence which pervade *The Lancet* reports. Focussing on their misrepresentation of the latest factual evidence relating to the health factors involving air pollution and water supplies, he demonstrates how the main cause of global pollution deaths is from open-fire cooking and heating in the less-developed world, which causes ten times as much health damage in China and India than do their coal-fired power plants, which the climate alarmists so hate.

He also points out that global health has in fact dramatically improved during the past near two centuries of modest global warming. This is mainly due to economic development and especially because of improvements in institutional health provision in the developed world, something which the climate alarmists choose to ignore since it does not fit in with their ideological position.

Interestingly in this debate, it should be noted that modest global warming of the degree we have enjoyed is actually less health-threatening than global cooling. Warming does not significantly increase mortality; it *does* reduce temperature-related deaths. It is officially estimated that in the UK only 3 deaths per 100,000 of the popula-

tion are heat related. However, 61 deaths per 100,000, twenty times as many, are cold related. So a cooling cycle, should it reappear, would be intrinsically more threatening to health than a warming one. This is not just in the UK. Stanford University research estimates that an increase of warming temperatures of 2.5°C would reduce mortality in the USA by 40,000 deaths a year and so greatly reduce medical costs.

Most global ill health and mortality derives, not from industrial development and related climate matters, but from underdevelopment, especially domestic pollution and the malnutrition that can render it fatal. This does not mean that there are not serious concerns over climate change, where properly evidenced. But they should be addressed rationally, and not dogmatically.

Professor Paunio's well researched paper shows that *The Lancet's* concerns are not properly evidenced. His facts and arguments are vitally important and should be widely read, especially by policy makers and media commentators, not just for exposing the particular falsehoods in the reports, but also for demonstrating the dangers lying in the wider climate change debate of political groupthink.

Bernard Donoghue MA, D.Phil (Oxon)
Senior Policy Adviser to the Prime Minister 1974–79
Minister for Farming and Food 1997–99

About the author

Mikko Paunio, MD, MHS was born in Turku, Finland in 1961. He graduated and then completed and defended his doctoral thesis at the University of Helsinki in 1990. He has post-graduate training from the Free University of Brussels in 1991 and has graduated from the Johns Hopkins Bloomberg School of Public Health (Master of Health Science in 1993). He is a certified (University of Helsinki) specialist in public health (1999) and is an adjunct professor in general epidemiology at the University of Helsinki.

He comes from a family with academic traditions and is a third generation social democrat. He joined Finland's Social Democratic Party in 1977. He has worked in the following institutions: the Institute of Health and Welfare of Finland, University of Helsinki, Johns Hopkins Bloomberg School of Public Health, the European Commission, the World Bank and Finland's Ministry of Social Affairs and Health. He has 40 publications listed in the US National Library of Medicine at the National Institutes of Health. He has a wife and three children.

Executive summary

The Lancet, one of the world's leading medical journals, recently published two long commissioned reports, timed to coincide with 23rd Conference of Parties to the UN Framework Convention on Climate Change and the third UN Environment Assembly. The journal's aim was to boost climate change mitigation and enhance a 'Pollution-free World' initiative in the name of public health. This paper gives examples of the biased, misleading and false health-based arguments that are made in these reports.

The main conclusions of the *Lancet* reports – widely disseminated by the mass media – were as follows:

- that a huge global mortality burden is attributable to industrial pollution
- that a key to gaining health co-benefits of climate change mitigation is to introduce a moratorium on construction of coal-fired power plants.

Both conclusions are false. To arrive at them, the authors of both reports have hidden the benefits of the comprehensive institutional environmental health protection action – based on hygiene principles – that helped to eradicate malnutrition from today's richer nations in the period after the Second World War. The authors of both reports have also, by not quoting (or by misquoting) a game-changing article published in *Nature*, advanced the false argument that industrial development is to blame for much disease and mortality around the world, and in particular in the developing world.

The *Lancet* report declared that 9 million deaths each year are attributable to 'pollution'. However, almost all these deaths are a function of underdevelopment. Pervasive fecal pollution, including animal manure, is the root cause of mass malnutrition among 800 million people, causing repeated bouts of diarrhea that often leave children permanently malnourished or stunted. Malnutrition then makes people especially vulnerable to the detrimental effects of indoor and outdoor air pollution from the domestic burning of wood, other forms of biomass, and coal for heating and cooking. The *Lancet* pollution report mentions the link, but shamefully fails to deal with the implications.

Neither of the *Lancet* reports is of much help in putting the vitally important but totally neglected subject of institutional environmental health action on the sustainable development agenda. Although the authors of the pollution report have sought to take the moral high ground by quoting the Pope's *Laudato Si* encyclical on the environment, both of the reports are immoral, and gross distortions of public health science and the historical achievements of health protection.

1 Introduction

On 19 October 2017, *The Lancet* published the report of the 'Lancet Commission on Pollution and Health'.¹ I call this report hereafter 'the P-report'. The key, and to a large extent erroneous, message of the P-report to the global community and politicians was that:

...ambient air pollution, chemical pollution, and soil pollution – the forms of pollution produced by industry, mining, electricity generation, mechanised agriculture, and petroleum-powered vehicles – are all on the rise, with the most marked increases in rapidly developing and industrialising low-income and middle income countries.¹

The headline claim was that this pollution was to blame for 9 million deaths each year. The report was a pre-planned lobbying effort by *The Lancet*, an attempt to influence the outcome of the third UN Environment Assembly in Nairobi on 6 December 2017, at which a declaration on the elimination of pollution and related activities was about to be approved by the member states. In the adopted text, published in the name of the world's environment ministers, the preamble section quotes from the P-report as follows:

Highlighting the findings of the report of the *Lancet* Commission on pollution and health that health effects of pollution are underestimated in existing calculations of the global burden of disease and that pollution, which was responsible for an estimated 9 million premature deaths in 2015, is the largest environmental cause of disease and premature deaths in the world, and causes welfare losses amounting to 6.2% of global economic output; and concerned that deaths associated with ambient air, chemical and soil pollution are rising...

On 30 October 2017, *The Lancet* published a second commissioned report, entitled *The Lancet countdown on health and climate change: from 25 years of inaction to a global transformation for public health*.² This was just prior to the beginning of the 23rd Conference of Parties to the UN Framework Convention on Climate Change. I call this report hereafter 'the CC-report'. The core message of the CC-report to the general public and politicians was that there should be a complete moratorium on new coal-fired power plants and that by 2040 all coal-fired power plants should be closed unless equipped with carbon-capture technology. Throughout its text, this second *Lancet* report gives false, erroneous and misleading arguments about the so-called 'health co-benefits' of phasing out coal-fired power plants; it suggests, falsely, that by abolishing coal-fired power plants you can clean outdoor air.

In this paper, I will provide examples of the erroneous, misleading, and biased statements in, as well as important omissions from, the *Lancet* reports.

This is by no means the first time that my colleagues and I have been involved in refuting *The Lancet*. Twice before we have had to try to counter the journal when it has disseminated bad scientific advice with global repercussions:

- We were the first to refute³ Dr Andrew Wakefield's preposterous study⁴ that claimed that the MMR vaccine would cause autism coupled with a bowel condition.
- We were also first to refute^{5,6} – based on survey of 547 000 Finnish children who had received the MMR vaccine – *The Lancet*'s erroneously promoted idea that contracting measles would prevent allergic diseases.⁷ This highly questionable article aroused great nervousness amongst the global vaccination community but, based on our results, considerable efforts were made, especially in the US, to promote MMR vaccinations at paediatric clinics.⁸

This is also not the first time that I have been forced to struggle against the global development policy community, who for years prevented us from publishing our game-changing finding, based on a new immunological assay, that a single measles vaccination could not guarantee lifelong immunity.⁹ When we tried to publish a full discussion of the usefulness of the assay on a global scale,¹⁰ the resistance was again ferocious. However, ultimately our arguments prevailed: the WHO incorporated our findings in its measles vaccination strategy,¹¹ the paediatric academy in India – the last country still using a single-dose vaccination strategy – was persuaded to change its approach,¹² and the US Centers for Disease Control and Prevention researchers admitted that they had been wrong on this issue for 50 years!¹³

This paper is not meant to be a full analysis of these two long *Lancet* reports, but it serves to give the reader undeniable examples of how political motivations lead to twisted interpretations of evidence and to bad public health science. I have recently published extensive discussion of the adverse public health consequences of the drive for 'sustainability',¹⁴ and I refer the reader to that article for a deeper discussion of the issues outlined here. Much of the science behind this paper was peer-reviewed and published in a report I co-authored for the World Bank over ten years ago.^{15,16}

2 The P-report

Misleading on water

The P-report says that 1.8 million deaths each year are attributable to water pollution:

The [*Lancet* Global Burden of Disease] study estimates that, in 2015, 1.8 million deaths were attributable to water pollution, including unsafe water sources, unsafe sanitation, and inadequate handwashing. Of this total, 0.8 million deaths were estimated to be caused by unsafe sanitation and 1.3 million to unsafe water sources.^{17,*}

* In the quote $0.8 + 1.3 = 2.1$, so there appears to be an element of double counting. The quote is verbatim.

This is misleading because the 1.8 million figure for deaths attributable to water pollution includes *all* deaths from diarrhea. This implies that diarrhea is primarily transmitted through polluted water. It repeats the misdirection, which I call the 'clean drinking water bias', in a figure (reproduced in Figure 1). This bias is very common, even amongst highly trained experts.¹⁸ It is worth noting that the same misleading position is taken in the UN's sustainable development declarations, which stress only the need to provide clean drinking water.¹⁴ To avoid misunderstandings, it is acknowledged that drinking water can be an efficient transmission vehicle, for example in tragic situations like the Yemen cholera. However, the endemic load of diarrhea in the developing world owes much to poor hygiene.

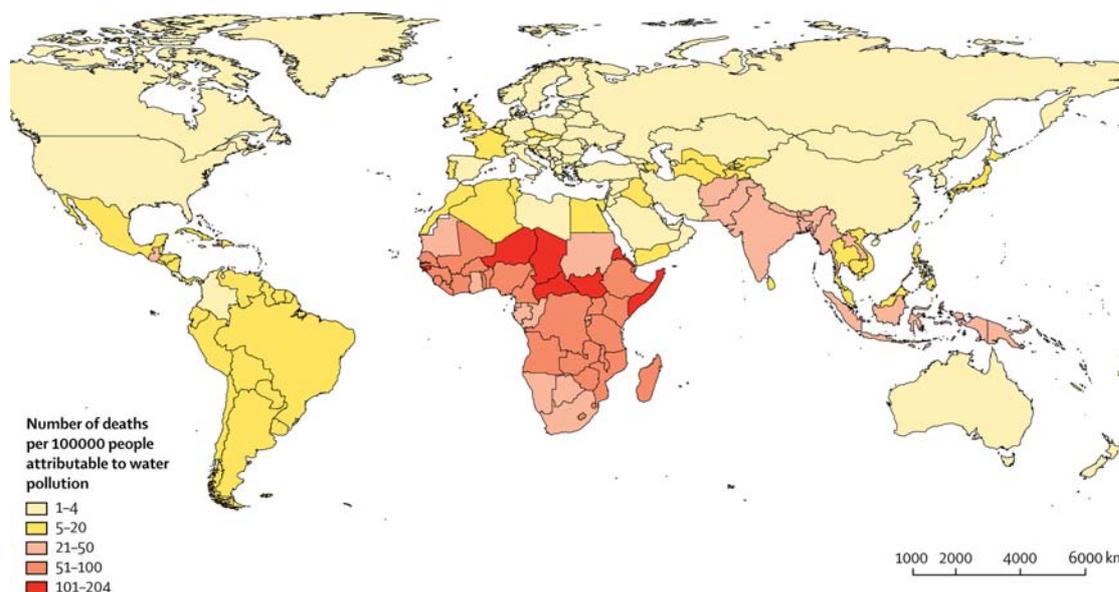


Figure 1: The P-report exhibits clean drinking water bias.

This map, which appears as Figure 12 of the P-report, erroneously suggests that diarrheal episodes are being caused by contaminated drinking water. In reality, the problem is lack of *adequate* water supplies, which leads to poor hygiene.

In fact, as shown in Figure 2, clean drinking water only brings down a child's risk of diarrhea by about 20%.¹⁹ In reality, perhaps as much as 80% of diarrhea transmission – so-called 'residual' transmission – takes place in other ways: through food, skin contact, indirect contact (e.g. flies) and so on.¹⁴ These transmissions can be readily prevented by better hygiene, and are therefore often referred to as 'water-washable' transmissions.^{14,16,19,20}

The authors of the P-report actually admit the importance of hygiene, but bury this important issue in the footnote to a table, which says of unsafe water and sanitation that it:

...includes, but is not limited to, no hand washing with soap.

The words 'but is not limited to' acknowledge, correctly but obscurely, that hand-washing is not the end of the story. The success of public health practices in rich countries confirms this.

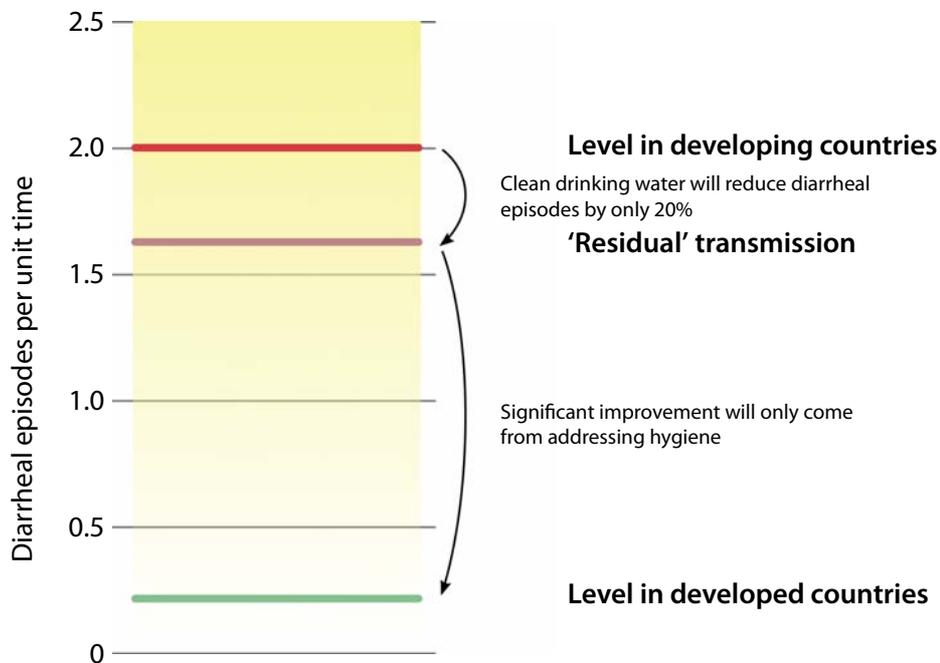


Figure 2: Reducing diarrheal episodes

This is a simplified representation. A more detailed version is given in the paper by Bartram and Cairncross.¹⁹ The figures shown are estimates.

Figure 3 shows the so-called 'F-diagram', which systematises thinking about the great leaps in public health that have been made in the developed world.¹⁴ A reliable and abundant water supply is certainly important, enabling not only washing but cleaning of homes as well; refrigeration is perhaps even more important. But underpinning everything is the availability of cheap, reliable electricity. Without it, refrigeration and clean water supplies, and therefore household cleaning and improved hygiene become impossible. Perhaps even more importantly, abundant water supply to homes is a prerequisite of healthy environments and forms the basis of prevention, management and even proper treatment of dozens and dozens of infectious diseases. Even HIV, which is *not* water washable, can be prevented by hygienic conditions: if an HIV-infected mother is given the opportunity to wash milk bottles, she can avoid dangerous breastfeeding of her child. I provide full discussion on this issue in my other publications.^{14,16}

Although the need for an abundant supply of clean water is clear and unarguable, in a recent (2016) WHO report, entitled *Preventing Disease through Healthy Environ-*

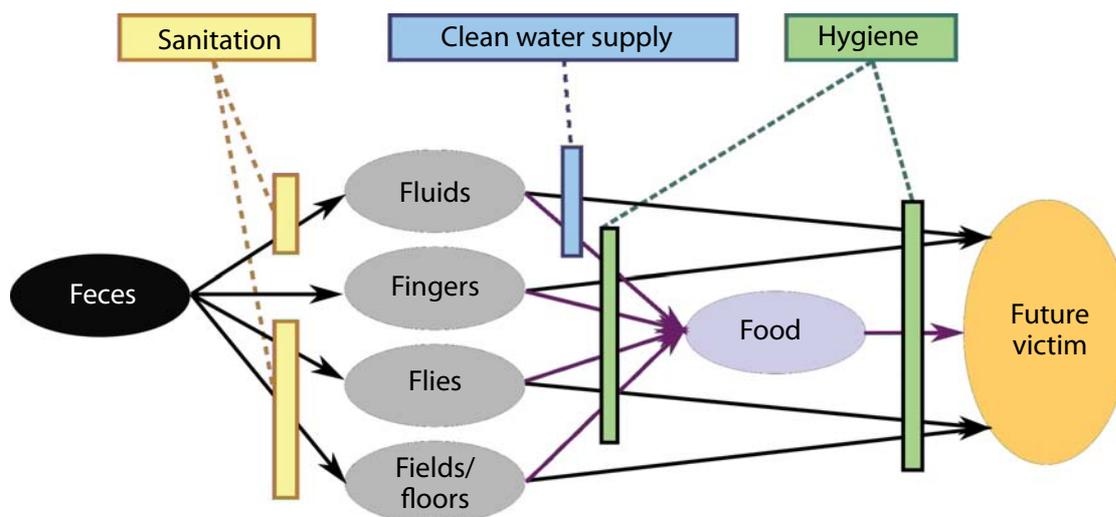


Figure 3: The F-diagram

Fecal contamination (left) is transmitted in various ways (grey) to food (purple) and thence to victims (right). The rectangular blocks show how transmission can be prevented.

ments,²¹ residual transmission was reduced to the hand-washing preventable fraction (20%) and the drinking water transmission proportion was increased to 35%. The report did not mention the water *quantity* issue and downplayed the link between unhygienic conditions and malnutrition, although it admitted that they probably underestimate this important link. This change of emphasis is hard to justify and it thus appears that the WHO has been under political pressure to pave the way for the 'pollution' argument. In the process, it has abandoned the poor and their desperate need to improve hygiene.^{14-16,19}

It appears that something similar is happening at *The Lancet*. The P-report mostly discusses household water purification and drinking water quality, rather than water *quantity* and the need for centralized household water supplies, which require in turn the availability of reliable electricity grids. This omission apparently reflects:

...the need to leapfrog the worst of the human and ecological disasters that have plagued industrial development in the past, and improve the health and wellbeing of their people.²²

This piece of argumentation in summary of the P-report is truly astonishing, as it refuses to acknowledge the public health miracle in rich countries that is – to a large extent – the result of vastly improved hygiene (Figures 2 and 3).^{14-16,19}

Two extracts from the P-report further illustrate this paternalistic attitude:

The health benefits associated with a project to improve water quality (eg, home disinfection of drinking water) exceed the reduced mortality risk and lost productivity measured in this chapter, and also include reductions in morbidity due

to diarrhoea, especially among children, and associated reductions in malnutrition.²³

The average benefit-cost ratio for deep borehole wells with hand pumps is 4.64, whereas household water treatment with bio-sand filters yields an average benefit-cost ratio of 2.48.²⁴

In Panel 12 of the P-report (reproduced here as Figure 4) it becomes apparent that centralized water supplies, which were behind the public health miracle in the developed world,^{14,16,19} are not to be replicated in developing countries. The poor people of the world are to be allowed clean water, but not very much of it.

Panel 12: Cost-effective policies to improve access to safe water and sanitation

Disinfection kits for home drinking water and ceramic filters are low-cost technologies for purifying drinking water in rural households without access to safe water. Latrines are a cost-effective solution to open defecation. Chlorination of home drinking water costs between US\$50 and \$125 per lifeyear saved; ceramic filters cost between \$125 and \$325.³⁸²

A seemingly attractive solution to improving access to safe drinking water and improving sanitation would be for donors to distribute chlorination kits, filters, and latrines free of charge. Empirical studies have shown, however, that this approach is ineffective and wastes resources because not all households will use disinfection kits for home drinking water, even when they are provided free of charge. A better solution would be to charge for the technology and subsidise the purchase. Studies suggest that people who pay something for a product are more likely to use it.³⁸³ Another effective approach is to distribute vouchers to households that can be redeemed when a kit is purchased.³⁸⁴ Requiring households to redeem the voucher separates the households that are likely to use the kit from those that are not.

Lowering the price of ceramic drinking water filters and latrines, which have a large upfront cost, can substantially increase their uptake.^{385,386} However, subsidies can be expensive. Microfinancing schemes that spread the cost of water filters or latrines over time have been effective in increasing uptake at a lower cost to funders than total subsidies.³⁸⁷ This approach allows a larger number of households to be covered for a given expenditure of funds and has the added benefit of gaining household and community ownership of the improvement. Composting toilets might have some advantages in some circumstances, for example where there is no sewage system.

Figure 4: Panel 12 of the P-report.

The text makes it clear that there is no intention that poor countries should have water supplies sufficient to reduce diarrheal episodes significantly.

Further examples of bias and deception in the report include this statement:

Despite general acceptance that well targeted water and sanitation interventions have positive benefit-cost ratios the scale of these benefits can be questioned, given the number of uncertainties that are usually involved.²⁵

This is a remarkable sentence when we think of the progress made in rich countries in the past 150 years.^{14–16,19}

The P-report’s Table 5 (reproduced here as Figure 5) is similarly misleading. The table gives figures for welfare losses due to various types of what it calls ‘pollution’. However, much important detail is hidden. For example, the welfare losses from air pollution in poor countries stem to a significant degree from the fact that malnourished children are particularly susceptible to infections of the respiratory tract. In other words, the causal chain for a significant proportion of these losses is from respiratory infection to malnutrition to diarrhea, poor hygiene, and ultimately to a lack of an adequate supply of water. This is not a pollution problem.

Even the equivalent figures for the developed world lack suitable caveats: there remains huge uncertainty about the effects of low-level ambient air pollution and the large GDP losses in the table are therefore probably significantly overblown, most likely due to political pressure.

Similarly, the figures shown in the table for welfare damages from ‘unsafe water and unsafe sanitation’ are similar to those published elsewhere,¹⁶ but hide the fact that almost half of the welfare loss is due to cognitive impairment related to malnutrition, which, as we know, is caused by inadequate hygiene and is thus not a pollution problem.

It is worth noting that the link between cognitive impairment and malnutrition and diarrhea is acknowledged elsewhere in the report.²⁶ This only makes the deception in the table worse.

	Ambient air pollution and household air pollution	Unsafe water and unsafe sanitation*	Lead exposure	Total
High income	US\$1691 (3.52%)	US\$159 (0.33%)	US\$303 (0.63%)	US\$2153 (4.48%)
Upper-middle income	US\$1691 (8.37%)	US\$89 (0.44%)	US\$118 (0.59%)	US\$1898 (9.40%)
Lower-middle income	US\$367 (6.38%)	US\$143 (2.49%)	US\$28 (0.49%)	US\$538 (9.36%)
Low income	US\$18 (4.83%)	US\$12 (3.30%)	US\$0.740 (0.20%)	US\$31 (8.33%)
Total	US\$3767 (5.06%)	US\$404 (0.54%)	US\$451 (0.61%)	US\$4622 (6.21%)

For the calculations see appendix (pp 27–28). *Includes, but is not limited to, no hand washing with soap.

Figure 5: Welfare damages from ‘pollution’.

The figures shown are welfare damages (in bln USD and as a percentage of gross national income) for groups of countries. This appears as Table 5 in the P-report.

Misleading on air

There is – according to a recent game-changing article in *Nature* by Lelieveld *et al.*²⁷ – an urgent need to control emissions from decentralized heating and cooking to reduce ambient air pollution in the megacities of Asia. These conurbations are now

replicating the catastrophic smog episodes that took place in London in the early 1950s, again the result of decentralized residential cooking and heating.²⁸

The P-report quotes the Lelieveld *et al.* paper three times. The first extract is as follows:

In the absence of aggressive intervention, the number of deaths due to ambient air pollution are on track to increase by more than 50% by 2050.²⁹

The second extract is this:

An analysis of future trends in mortality associated with ambient PM 2.5[†] air pollution finds that, under a 'business as usual scenario', in which it is assumed that no new pollution controls will be put into place, the numbers of deaths due to pollution will rise over the next three decades, with sharpest increases in the cities of south and east Asia.^{35,121} These trends are projected to produce a more than 50% increase in mortality related to ambient air pollution, from 4.2 million deaths in 2015 to 6.6 million deaths in 2050 (95% CI 3.4 million–9.3 million). These projections are corroborated by an analysis of the health effects of coal combustion in China. Population ageing are major contributors to these projections of growth and absolute increased numbers of deaths from pollution-related disease.³⁰

And the final extract is as follows:

Although household and ambient air pollution are considered separately in deriving estimates of disease burden, they are both comprised of many of the same pollutants and often co-exist; for example, in low-income and middle-income countries, household cooking contributes to ambient particulate air pollution. Accordingly, the total numbers of deaths attributed to air pollution in the [*Lancet* Global Burden of Disease] study and in the WHO estimates are less than the arithmetic sum of the number of deaths attributed to each form of pollution alone.³¹

As can be seen, none of these three quotes mention Lelieveld *et al.*'s game changing message that it is decentralized cooking and heating that are primarily responsible for the horrendous levels of ambient air pollution in Asian megacities. (The same authors note that power generation and industry are not the sources of particulate pollution in sub-Saharan Africa: they note that in Nigeria, the largest economy in that region, the proportion of particulate emissions from these sources is 0%.)

It is important to understand that economies of scale allow particulate matter to be removed from the exhausts of centralized coal-fired power plants in a cost-effective manner. This is simply impractical with decentralized heating schemes. So, while the wealthy middle classes in London may think that wood burning is 'green', the London mayor has now been forced to ban wood burning in many areas of London to prevent smog.³² My own residential area in metropolitan Helsinki today has

[†] PM 2.5 is particulate matter less than 2.5µm in size, so small that it readily penetrates deep into the lungs.



Figure 6: The Hanasaari power station.

Hanasaari produces both heat and electricity and is equipped with state-of-the-art emissions controls (the visible emissions are of steam). Environmentalists have managed to persuade the city council to close the plant by 2024, with the vague intention of replacing it with a new one burning wood pellets. However, delegations from Beijing have visited Helsinki to learn how to solve air pollution problems in China.



Figure 7: The town of Iisalmi, Finland.

Left: in 1960; right: today. The effect of the introduction of centralised power and heat production on air quality is clear.

very low PM2.5 levels, the annual average being below 10µg/m³, because of the adoption of centralized coal-based combined heat and electricity production, from power stations like the one shown in Figure 6. Only a very small proportion of this residual particulate exposure is attributable to power production. The city was awarded several UN environment prizes in the 1980s because of its approach to power generation and the effect on the atmosphere is clear from Figure 7.

The mass media's preposterous message

The mass media trumpeted the P-report's message that rising industrial pollution is responsible for nine million annual deaths. For example, on 20 October 2017, the headline in *Helsingin Sanomat*, Finland's equivalent of *The Guardian*, screamed that 'Pollution kills up to nine million people in one year, say researchers – industrial pollution and emissions from traffic are the most serious threat to human health'. Illustrating this 'news' were photographs of smokestacks from Chinese heavy industry and cars driving in the Beijing smog.

The P-report's Figure 5 (reproduced below as Figure 8) might even have been seen as supporting such a claim. But its 'pollution' category actually included deaths that were due to lack of clean water, something that was only admitted on page 23 of the report:

In low-income countries, the largest productivity losses due to pollution-related disease result from lack of access to safe water and sanitation, followed by exposures to air pollution.

It is important to note that the global disease burden attributable to environmental factors in rich countries is very low. In middle-income countries, residential heating is still the prevailing source of pollution.²⁷

3 The CC-report

False claims on coal pollution

The CC-report² asks if a policy opposing coal-fired power plants:

...represents the beginning of reductions in morbidity and mortality from air pollution, and a potentially remarkable success for global health.³³

Like its sister report, the CC-report is marred by use of biased and misleading statements. I will trouble the reader with just a few examples.

Figure 22 of the CC-report (adapted here as Figure 9) illustrates emissions contributions from various sectors. It is correct, reporting that there is only a tiny contribution to PM2.5 pollution from coal-fired power plants but a huge contribution from domestic cooking and heating. The text, however, interprets the figure in a highly

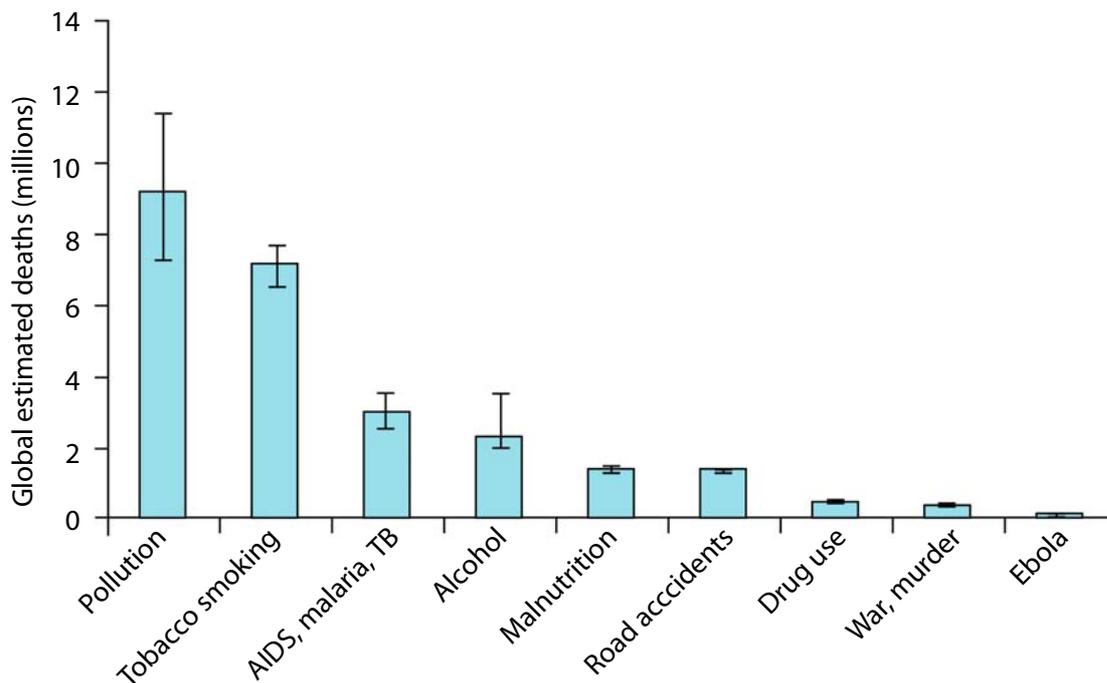


Figure 8: Global deaths by cause
 Reproduced from the P-report's Figure 5.

misleading manner, implying that coal-fired power plants are responsible for most PM2.5 emissions globally:

The energy sector (both production and use) is the single largest source of man-made air pollution emissions, producing 85% of particulate matter and almost all of the SO₂ and NO_x emitted worldwide (Figure 22). Coal power is responsible for three-quarters of the energy sector's sulphur dioxide (SO₂) emissions, 70% of nitric oxide (NO_x) emissions, and more than 90% of PM_{2.5} emissions.³⁴

The authors then correctly admit that:

...in the past decade, these emissions have largely decoupled from increases in coal fired generation in several geographies because emission standards have been introduced for coal power plants.³⁴

But this is not how the content of the CC-report was reported to the world. For example, Finland's national broadcaster, YLE, reported the CC-report as saying that 'it is mainly heat waves, pollution and disease that kill people', and quoted WHO official Anthony Costello as saying that 'climate change mitigation offers huge health co-benefits to global public health'.³⁵

Moreover, if you approach PM_{2.5} issue from a human-exposure angle, rather than an emission-source one, you find that almost all human PM_{2.5} exposure is under-

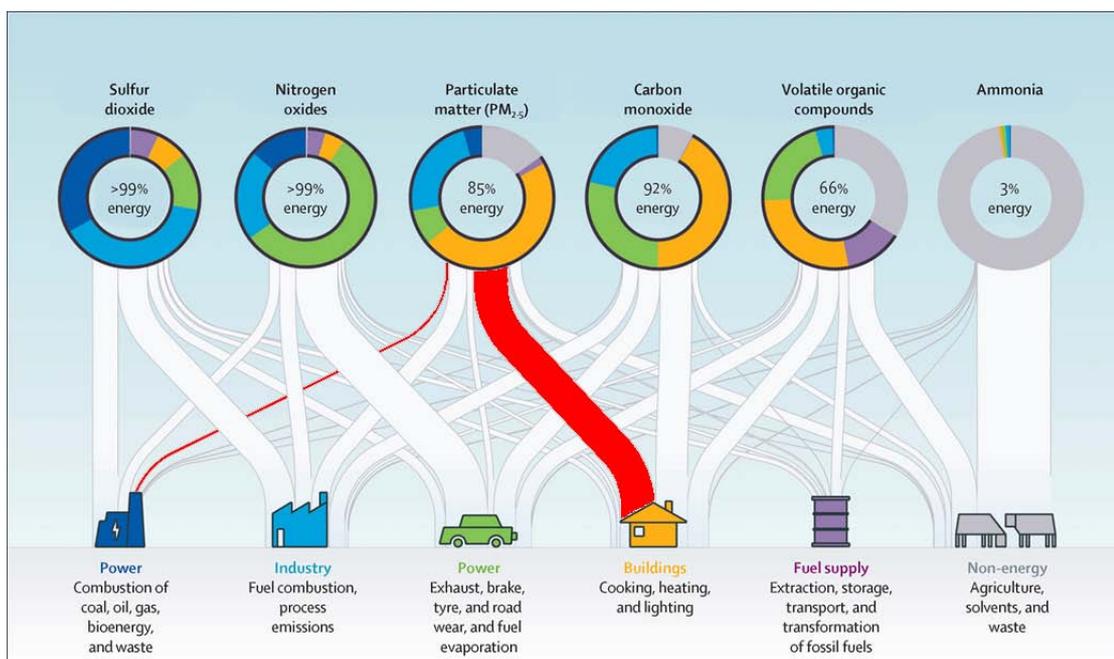


Figure 9: Sources of air pollution.

Adapted from the CC-report's Figure 22, with the contributions from (left) power generation and (right) decentralised cooking and heating highlighted in red for the purposes of this paper.

development related. The CC-report's authors partially admit this, saying that:

Sources with low stack heights that are located close to populations (e.g. household combustion for cooking and heating, road vehicles) typically have a disproportionately larger role for total population exposure...³⁶

Another perhaps even more important reason is the horrendous PM_{2.5} levels inside homes in poor nations, especially in sub-Saharan Africa, the result of cooking on open fires. These are destroying the health of mothers and their babies.¹⁶

The small print on deaths attributable to coal-fired power stations

In its Figure 24, reproduced here as Figure 10, the CC-report states that in China, 6% of air pollution related deaths are attributable to coal-fired power plants. The corresponding figure for India is 15%. The correct and accurate figures, from Lelieveld *et al.*,²⁷ are 7% and 5% respectively. And while the CC-report suggests that 18% of air-pollution attributable deaths in China and 23% in India are attributable to domestic heating and cooking, the correct figures are 76% and 77% respectively. Similarly, the CC-report figures for deaths caused by industrial pollution of 29% for China and 18% for India; the correct figures are 3% for both countries. Because of the use of

tall smoke stacks and atmospheric dilution, human exposure to industrial pollution is very small compared to that from residential heating in these countries. The extent to which the CC-report distorts the true cause of pollution-related deaths can be seen in Figure 11.

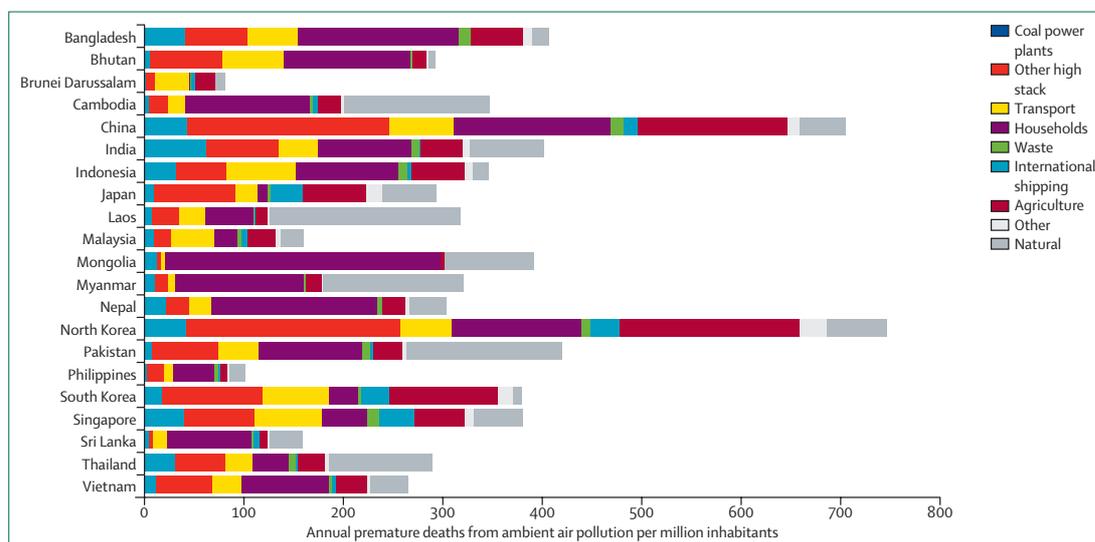


Figure 10: Health impacts from exposure to PM2.5 in Asian countries in 2015. Figure 24 from the CC-report.

China has built some centralised heating systems, based on obsolete Soviet technology dating back to the 1950s. However, the penetration of these systems in cities is only 22% and is very low in the country as a whole. Thermal security in China is mostly provided by decentralized heating, primarily using coal. In rural areas, particularly in the north, it is still often based on the *kang*, an coal-fired stove-cum-bed inside the house.³⁷ In urban areas, the key strategy to combatting air pollution is to bring about the widespread use of up-to-date district heating systems.³⁸

The CC-report admits that 4.3 million deaths in the developing world each year are attributable to indoor air pollution from the burning of wood, cow dung, crop residues, and coal. It even says that:

... [r]eplacement of household combustion of coal in China would result in health benefits not only from ambient (outdoor) but also household (indoor) exposure to air pollution.³⁹

But unfortunately, this important public health information did not form part of the PR campaign that accompanied the report. The interested reader can easily find examples from *The Lancet's* PR follow-up.

The real reason why the CC-report did not – apparently intentionally – quote the Lelieveld *et al.* article at all is obvious. Activists want to persuade the global audi-

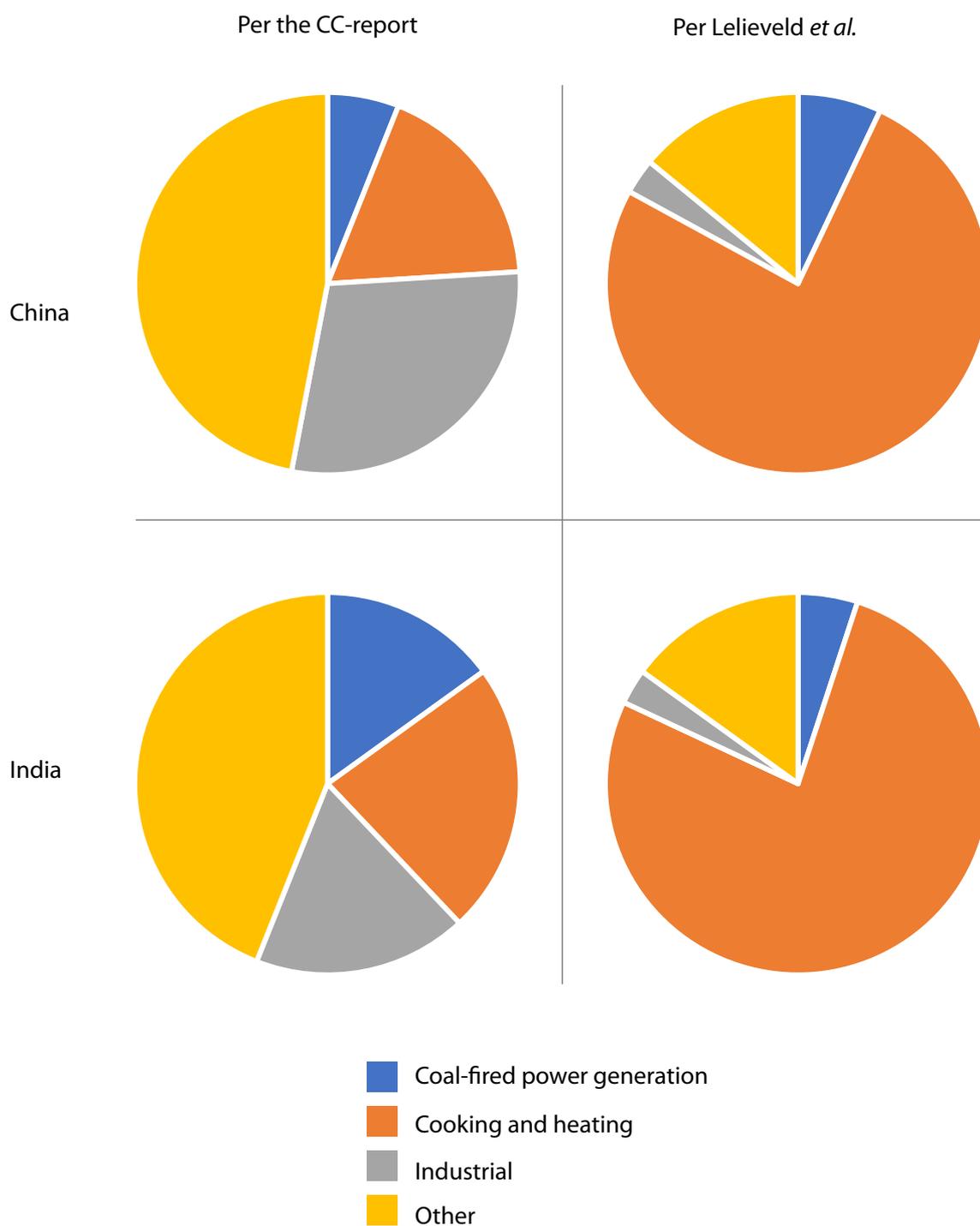


Figure 11: How the CC-report hid the true cause of pollution-related deaths. The charts summarise deaths by pollution source for China (top) and India (bottom) for the CC-report (left) and the Lelieveld *et al.* paper (right).

ence and decision-makers that vast numbers of deaths are attributable to industrial pollution, flying in the face of the fact that practically all pollution-attributable deaths are a function of underdevelopment.^{14–16,19} Industry's share of attributable pollution-related deaths would have shrunk dramatically if the figures of Lelieveld *et al.* had been used in the report (see Figure 10), killing off the P-report's suggestion that 9 million deaths annually are associated with industrialization. But turning a blind eye to these facts left the CC-report's authors free to issue a call to phase out coal-fired power.⁴⁰

4 Comment and conclusions

The medical profession lost its interest in environmental health issues sometime during the 1970s, when the health protection infrastructure in the West was completed. The field was handed over to others. This has helped to create a situation in which there now are few environmental health scientists linked to the medical profession. This means, incidentally, that what might appear as important new information is in fact nothing of the sort. For example, although the Lelieveld *et al.* findings were considered to be radical new information when the paper was published, its core message was in fact of no surprise to the handful of seasoned environmental health experts. We, in the field of environmental hygiene, have known these facts for decades (Figure 6).

But the lack of medical experts in the environment health field has led to more important problems. There are now few people who are capable of challenging the barrage of environmental health scares that have appeared in recent decades, no doubt inspired by Rachel Carson's *Silent Spring*.⁴¹ The quasi-scientific 'environment and health' reports that are used to promote these scares, of which *The Lancet* reports are just the latest example, are thus given a free ride.

Based on the evidence presented in both reports, and the important new findings²⁷ that were intentionally ignored in them, the 9 million deaths attributable to 'pollution' are in fact almost all attributable to underdevelopment. The pervasive presence of fecal pollution (including animal manure) in immediate human environments is a root cause of mass malnutrition that affects 800 million people and makes them especially vulnerable to the detrimental effects of indoor air pollution caused by domestic burning of wood, other forms of biomass, and coal for cooking and heating.^{14,16}

The most unfortunate repercussion of the *Lancet* reports is that their ahistorical approach – ignoring the huge success story of institutional environmental health action in rich countries – does not help those who desperately need to improve their lives.^{42,43} It is simply wrong to claim, as the P-report does, that environmental pollution regulation since the 1970s has slashed environmentally attributable morbidity and mortality in rich countries.^{14–16,19}

The authors of the P-report's summary have tried to take the moral high ground, quoting the Pope's *Laudato Si* environmental encyclical, and with the following reasoning:

...the need to leapfrog [apparently by using alternative energy sources and cost-effective water supplies] the worst of the human and ecological disasters that have plagued industrial development in the past, and improve the health and wellbeing of their people.

I find this attitude immoral and a gross distortion of public health science and the historical achievements of health protection.^{42,43}

5 Epilogue

John Snow – the founding father of modern analytic epidemiology – was an ardent enemy of the 19th century sanitary movement,^{44,45} which resembles in many ways the contemporary environmental movement. He became a scientific heretic when, in September 1854, he came to the conclusion – based on meticulous observation – that the horrendous Broad Street cholera outbreak was not attributable to ambient air pollution but to contaminated drinking water. He recommended the local parish authority remove the pump handle of the Broad Street water pump.⁴⁵ His advice is often remembered and even hailed in contemporary quasi-scientific works, including *Silent Spring*.

Much less attention has been paid to the fact that Snow gave testimony in Parliament in 1855 refuting the idea, dominant at that time, that ambient air pollution or industrial effluents could have caused cholera and other diseases.⁴⁴ Snow's testimony so greatly offended the sanitary movement and its ardent ally *The Lancet*, that when he died in 1858, his obituary in the journal did not mention his contributions in cholera epidemiology at all. Only his achievements in anesthesiology were recognized. *The Lancet* only apologized for their behaviour in 2013.⁴⁶

I therefore wonder if, in the year 2173, *The Lancet* will be issuing an apology for publishing these two politically motivated reports, which likewise give bad policy advice based on poor science.

The views presented in this paper are mine alone, and do not necessarily represent those of my employer.

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1	Andrew Turnbull	The Really Inconvenient Truth or 'It Ain't Necessarily So'
2	Philipp Mueller	The Greening of the Sahel
3	William Happer	The Truth about Greenhouse Gases
4	Gordon Hughes	The Impact of Wind Power on Household Energy Bills
5	Matt Ridley	The Perils of Confirmation Bias
6	Philipp Mueller	The Abundance of Fossil Fuels
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16	Susan Crockford	The Arctic Fallacy
17	Indur Goklany	The Many Benefits of Carbon Dioxide
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29	Mikko Paunio	Sacrificing the Poor: <i>The Lancet</i> on 'pollution'

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