

# PM 2.5 IN CHINA

## LOOKING OUT FROM 'UNDER THE DOME'

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My dad and I enjoying the smog at Disneyland, Shanghai (Halford, 2018).

*"The pursuit of infinite economic growth on a finite planet is going to kill us all, and soon"*

(Smith, 2023)

Pollution and public health are two areas which have both been receiving greater attention in public discourse over the past decade, with activists such as Greta Thunberg and events such as the COVID-19 pandemic bringing the respective subjects to the fore. When I think of

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pollution, my mind immediately jumps to climate change as the key consequence and whilst this is certainly not to be overlooked the effect of pollution on our health is often less discussed. Throughout China, increasing levels of smog, due to the combustion of fossil fuels, have led to poor air quality across the country and a huge increase in the levels of PM2.5 (Xing *et al.*, 2016). PM2.5 are particles with a diameter of less than 2.5 micrometres capable of impairing lung functionality (Xing *et al.*, 2016). After an overview of Chai's (2015) documentary *Under the Dome*, there will be an evaluation of the research question, *how serious is the threat of PM2.5 to China's population today and moving forward?*

### ***Under the Dome: Air Pollution in China (Chai, 2015)***

Chai's (2015) presentation/documentary laid out the detrimental health impacts of air pollution in China on citizens between 2004-2014. It began with the emotive tale of how Chai was afraid to let her daughter out of the house at a young age for more than half of the days of the year due to poor Air Quality Index (AQI) levels and her daughter's underlying health condition. This resulted in Chai holding resentment towards the smog, leading to an investigation to uncover the causes of such high levels of pollution, despite the lack of visible industry in her city. The documentary saw Chai travelling from China, to the UK, and the US, to see how different environmental laws are implemented throughout the globe and how other countries have handled high levels of pollution historically.

The key findings of Chai's were that China has a far greater reliance on coal power when compared to other more economically developed countries (MEDCs), and that the coal (and other fuels) it does use are far less clean. Some of the striking figures from Chai's presentation include that only 3% of fuels used in China are deemed to be of 'high quality', and that the highest quality diesel used across petrol stations in China is at least 25 times higher in sulphur content compared to the US, Europe and Japan. What is more, in other MEDCs, 95% of coal is washed before it is burned, drastically reducing the amount of PM2.5 it releases into the atmosphere. In China, however, less than half of the coal burned is washed. Finally, and perhaps most strikingly of all, is that China does have similar strict

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environmental protection laws as other MEDCs; however, they fail to enact upon *any* of them. For example, laws put in place to allow for the recalling or destruction of vehicles which breach emission laws were utilised a grand total of *zero* times in the decade to 2012 from 2002, when the laws were first introduced. This is despite thousands of vehicles which do not meet the standards lining the streets of Beijing which are known to authorities. The same can be said for steel manufacturers which do not comply to environmental standards, *none* of them have received any form of formal repercussions. Using cheap fuels allows steel to be produced at a lower cost, and combined with the Chinese Communist Party's (CCP) subsidisation of steel production, allows Chinese manufacturers to greatly undercut any competition. Millions of jobs and millions of Yuan (RMB) are dependent on energy. Many fear changing their approach to cleaner energy would result in less economic growth. To quote a member of PetroChina, the company that holds a monopoly on China's energy production: "We are fat [with wealth], but have no power [to make environmental change]".

### **Personal Reaction**

Personally, I found the documentary to shed light on unique perspectives surrounding the issues of air pollution. It was refreshing to see non-Western research in the limelight and begin to understand the difference in national operations in China. It was also moving to hear about the individual experiences of those affected by the smog, especially the six year old girl who had never seen a clear sky in her life. It brought back memories of my own time living in Shanghai for a semester back in 2017. It made me remember how I felt wearing a PM2.5 mask for the first time and changing the filter each week after it changed from a pristine white to a grimy grey. Those memories, combined with the bleak outlook given by Chai's research, have refocused my attention on the importance of improving air quality *now* and not viewing it as tomorrow's problem. The documentary also helped me to realise that China's pollution is also everybody else's pollution, both in the sense that other nations 'export' their pollution to China through manufacturing and that China's pollution is then distributed globally due to PM2.5's ability to travel long distances in the atmosphere (Department for Environment, Food & Rural Affairs, 2023).

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## **How serious is the threat of PM2.5 to China's population today and moving forward?**

Chai investigated the impact on the 600 million Chinese citizens that the smog has, including how it shifts people's perceptions of nature and even leads to 'smoker's lung' style surgeries being required. The main cause for concern identified by Chai is the PM2.5 particles, which were causing half a million premature deaths in China each year at the time of the documentary's release. However, the documentary was released almost a decade ago and the investigations and findings of Chai were predominantly based on a pre-Xi China. Since then, Xi has established a firm grip on his position as the General Secretary of the CCP and he has promised to make China a net zero carbon emitter by 2060, cutting fossil fuel usage down to 14% (Venditti, 2021; Bloomberg, 2022). Nevertheless, China is still currently the largest consumer of coal, even more so today than it was at the time of Chai's documentary, with the nation producing and burning half of the world's coal (Smith, 2023). In fact, China's carbon emissions have more than quadrupled in the past three decades, perfectly correlating to a 435% increase in lung cancer in China over the same timeframe (Chai, 2015; Smith, 2023). China has backed itself into a corner where it cannot 'decarbonise' in any meaningful timeframe, and whilst the consequences of climate change are widely discussed, the impact of PM2.5 on individuals' health is far more subdued.

The main issue with PM2.5 is that it is both extremely small (almost 1/50th the size of a grain of sand) and extremely numerous, meaning that it can easily surpass the body's natural physical defence systems such as mucus and nasal hairs and overwhelm the lungs and immune system (EPA Victoria, 2021). Today, the particles are responsible for one million deaths in China every year, double the number at the time of Chai's documentary (Chai, 2015;

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Yue *et al.*, 2020). PM2.5 has been identified as the “greatest environmental risk factor for human health globally”, and it even has its own measurement of mortality: deaths attributable to PM2.5 pollution (DAPP) (Yue *et al.*, 2020, p. 2). Each year, DAPP increases by almost 2% in China with PM2.5 leading to higher levels of heart disease and lung cancer (Yue *et al.*, 2020).

As stated in Chai’s (2015) presentation, the reason that the CCP has not taken more steps in attempting to reduce levels of PM2.5 is due to their fear that it would cause an economic slowdown and a loss of over 40 million jobs in the steel industry. There is a need to maximise both employment and consumerism in order to maintain political influence and stability domestically and abroad (Hu, 2011; Smith, 2023). However, in this desperate attempt to maximise political and economic growth, there is a great risk that it could also lead to a collapse in a workforce that is overexposed to PM2.5. China is already burdened economically with a decreasing domestic workforce due to an ageing population (Mao *et al.*, 2020). Increased absences from work as well as premature deaths in the working age population will further increase the burden (Yan *et al.*, 2021). Ironically, China’s refusal to decarbonise in its attempt to pursue endless economic growth may actually lead to a rapid economic decline as a result of an increasingly reduced workforce and increasing medical expenditure due to PM2.5.

## **Conclusion**

The seriousness of PM2.5’s threat to China’s population is ever increasing. With the CCP showing no signs of attempting to reduce their reliance on fossil fuels before at least 2030, there is a great possibility that the nation’s population may have to live with an increasing number of complex respiratory and cardiovascular diseases (Xing *et al.*, 2016; Venditti, 2021). This could place further strains on an already diminishing domestic workforce, leading to a dreaded economic slowdown that the CCP has thus far done everything in its power to avoid. The implications of rising PM2.5 in China are not just limited to its own borders either. PM2.5 is a “long distance air pollutant”, able to be carried thousands of miles under the right

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meteorological conditions, meaning that China's PM2.5 carries to other nations and can result in causing similar health complications. (Amnuaylojaroen *et al.*, 2020, p. 2). In order to make a meaningful impact on reducing China's air pollution, other nations need to lobby against China's reliance on fossil fuels as well as reduce their reliance on China for cheap manufacturing.

**WORD COUNT: 1638**

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