PM2.5 AND OTHER AIR POLLUTANTS - HEALTH-BASED STANDARDS

The WHO says: "Particulate pollution has health impacts even at very low concentrations – indeed no threshold has been identified below which no damage to health is observed."
https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

There is no safe level of fine particulate pollution.
Particulate Matter is harmful to everybody even to so-called healthy people.

So why are we using these graded PM2.5 health-based categories extending way beyond good air quality?
Different categories exist around the world, even in Australia, but none echo the science. It is more confusing when many jurisdictions report in overly complicated Air Quality Indexes (AQIs). GET RID OF THEM!

The World Health Organisation must take some responsibility for this as they only issue Air Quality GUIDELINES (AQG) not Standards. They publish long average monitoring times, nothing less (annual and 24 hour) and set interim targets well above what we in Tasmania are using now. See below…
Why is there not a STANDARD for harmful PM1.0 ultra-fine PM?

Table 0.1. Recommended AQG levels and interim targets

Pollutant	Averaging time	Interim target				AQG level
		1	2	3	4	
$PM_{2.5}$, µg/m³	Annual	35	25	15	10	5
	24-hour[a]	75	50	37.5	25	15
PM_{10}, µg/m³	Annual	70	50	30	20	15
	24-hour[a]	150	100	75	50	45
O_3, µg/m³	Peak season[b]	100	70	–	–	60
	8-hour[a]	160	120	–	–	100
NO_2, µg/m³	Annual	40	30	20	–	10
	24-hour[a]	120	50	–	–	25
SO_2, µg/m³	24-hour[a]	125	50	–	–	40
CO, mg/m³	24-hour[a]	7	–	–	–	4

[a] 99th percentile (i.e. 3–4 exceedance days per year).
[b] Average of daily maximum 8-hour mean O_3 concentration in the six consecutive months with the highest six-month running-average O_3 concentration.

WHO Air Quality Guidelines
https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

There are variations between Australian states and territories with our health-based standards and our monitoring periods. Why? Wood smoke consists mainly of fine Particular Matter (PM2.5). Wood smoke is wood smoke. It is harmful no matter where you live and smoke crosses borders.
Everybody knows this. We just need a national EPA with teeth to give us clean air.
Air monitoring means nothing if it is not followed up with consistent and persistent regulatory action.

Health -based standards, comments, categories, and air monitoring intervals, differ between just three of the States shown below. This is how bad it is at present:-

Air quality categories (AQC)							
Air pollutant	Averaging period	Units	GOOD	FAIR	POOR	VERY POOR	EXTREMELY POOR
Ozone O_3	1-hour	pphm	<6.7	6.7–10.0	10.0–15.0	15.0–20.0	20.0 and above
	8-hour rolling	pphm	<5	5–6.5	6.5–9.75	9.75-13	13.0 and above
Nitrogen dioxide NO_2	1-hour	pphm	<8	8–12	12–18	18–24	24 and above
Visibility Neph	1-hour	bsp	<1.5	1.5–3.0	3.0–6.0	6.0–18.0	18.0 and above
Carbon monoxide CO	8-hour rolling	ppm	<6.0	6.0–9.0	9.0–13.5	13.5–18.0	18.0 and above
Sulphur dioxide SO_2	1-hour	pphm	<13.3	13.3–20.0	20.0–30.0	30.0–40.0	40.0 and above
Particulate matter < 10 µm PM_{10}	1-hour	µg/m^3	<50	50–100	100–200	200–600	600 and above
	24-hour	µg/m^3	<33.5	33.5-50	50-75	75-100	100 and above
Particulate matter < 2.5 µm $PM_{2.5}$	1-hour	µg/m^3	<25	25–50	50–100	100–300	300 and above
	24-hour	µg/m^3	<16.75	16.75-25	25-37.5	37.5-50	50 and above

NSW Air Quality Categories
https://www.airquality.nsw.gov.au/health-advice/air-quality-categories#:~:text=In%20New%20South%20Wales%2C%20five,monitor%20at%20our%20monitoring%20locations.

Pollutant	Measurement	Good	Fair	Poor	Very poor	Extremely poor
Ozone	ppb	Less than 50	50–100	100–150	150–300	300 and above
Nitrogen dioxide	ppb	Less than 60	60–120	120–180	180–360	360 and above
Sulfur dioxide	ppb	Less than 100	100–200	200–300	300–600	600 and above
PM_{10}	$\mu g/m^3$	Less than 40	40–80	80–120	120–300	300 and above
$PM_{2.5}$	$\mu g/m^3$	Less than 25	25–50	50–100	100–300	300 and above
Carbon monoxide	ppm	Less than 30	N/A	30–70	N/A	70 and above

Victorian AirWatch categories
https://www.epa.vic.gov.au/for-community/monitoring-your-environment/about-epa-airwatch/calculate-air-quality-categories

Air pollution ($PM_{2.5}$ $\mu g/m^3$)	AirRater (from 2021)
0 to 9	Good
10 to 24	Fairly good
25 to 49	Fairly poor
50 to 99	Poor
100 to 299	Very poor
300+	Extremely poor

Tasmanian AirRater categories
https://airrater.org/what-are-the-air-quality-categories/

Tasmania's Dept of health has set the GOOD category at 0-9 ug/m3, not 25ug/m3.
Note: It is widely claimed Tasmania has some of the cleanest air in the world. But it is still not good enough to set it at <9ug/m3 when 5ug/m3 averaged over one hour is considered healthy ambient air. And it does not help when Tas Health states, "*it is unlikely you will be at risk of serious health harms from breathing smoky air*." while further minimising the harm by describing smoke as "*unpleasant*", and symptoms, "*should clear up quickly when the smoke goes.*"
THIS IS NOT WHAT THE SCIENCE SAYS.
https://www.health.tas.gov.au/health-topics/environmental-health/air-quality

It is time Australia caught up with the health science and adopted PM2.5 BINARY HEATH-BASED CATEGORIES and Comments, with:-

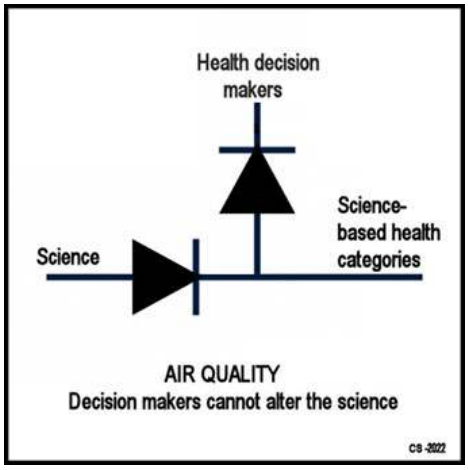
- **i) One hour rolling average monitoring,**
- **ii) 10 minute near real-time reporting for raw PM2.5 data.**
- **iii) Just two health-based categories:-**
- **iv) GREEN: 0-5ug/m3 for good air.**
- **v) RED: unhealthy air for everyone.**
- **vi) Any episode averaged over one hour above 5ug/m3 being classed as an exceedance.**
- **vii) AQ Indexes: Confusing AQIs removed. Individual raw pollutant readings coming straight off the instruments.**
- **viii) No exceptions, e.g. bushfires, planned burning, solid fuel heating, etc.**

Smoke is smoke as far as our health is concerned.

This is what the mandatory health-based PM2.5 category right across Australia should look like:

I I >>> >>> >>>
0 5ug/m3

5ug/m3 averaged over one hour is considered to be good ambient air.
Australia and every living thing in Australia requires good air.
We cannot keep treating the air as a sewer.
5ug/m3 should be considered a Practical Threshold for ambient air quality (AAQ) when there is no safe level of Particulate Matter and where 0 ug/m3 is almost impossible to meet.
This same regulatory/monitoring process should be adopted for the other air pollutants.



International identities need to be prevented from lifting data from our air monitoring feeds, then altering them into other indexes and placing them on their world maps, e.g., United States Index (USI) These readings are wrong and misleading compared to ours.

“Every single disease that is non-communicable is impacted by air pollution. It is not only involved in worsening diseases but in causing them, and new diseases that would not otherwise occur are happening because of air pollution” – Sir Stephen Holgate, National Clean Air Conference Nov.20/21 . [Add COVID to this].

PM2.5 Health-based categories V.5.3 – C. Stott 13.7.2024