AUSTRALIAN SUSTAINABLE BUSINESS GROUP'S

Submission on

Draft POEO (Clean Air) Regulation

June 2022

Sydney, Brisbane

1 EXECUTIVE SUMMARY

The Australian Sustainable Business Group (ASBG) is pleased to comment on the NSW Government's *draft Protection of the Environment (Clean Air) Regulation 2022* (CAR) and its accompanying Regulatory Impact Statement (RIS).

The Australian Sustainable Business Group (ASBG) is a leading environment and energy business representative body that specialises in providing the latest information, including changes to environmental legislation, regulations and policy that may impact industry, business and other organisations. We operate in NSW and Queensland and have over 110 members comprising of Australia's largest manufacturing companies. Members were fully involved in the development of this submission and ASBG thanks them for their contribution.

ASBG has been provided direct evidence from members that the industry costs for moving from Groups 3 & 4 to Group 6 have been grossly underestimated. One site alone estimates its costs would greatly exceed the total RIS NSW industry costs. In addition, a quick investigation by ASBG identified more recent—2016 vs 2000 (even 1993) US EPA modelling data on such costs. These alone show RIS costs for SCR scrubbers—required to meet Group 6 NO_x limits— were underestimated by at least 180% if sourced locally within the USA. Also the costing used only reflected the equipment installed costs, not the business interruption costs, added costs due to Australia's need to largely import most of the equipment and technical support. Finally, the RIS fails to consider the multiplier effect on the industry sectors that the sunset clauses will affect. Overall, the air pollution upgrade costs for achieving Group 6, in the RIS are grossly underestimated. ASBG's re-estimation of the costs places significant questions on the justification of moving from Group 3 & 4 to Group 6. Consequently, the RIS should be redone to include the real cost estimates provided by industry.

In addition, the RIS bases its findings by grouping all industry under the Greater Metropolitan Region (GMR). However, there are multiple EPA and NSW Government reports on air pollution that routinely split the GMR in multiple air sheds. Wood heater air pollution within the RIS is split into the Sydney and GMR air sheds. ASBG is concerned the reasons to not show better granularity is that it paints industry in a poorer light as a source of air pollution. Including the air pollutants from large coal fired power stations overshadows Sydney industry emissions considerably.

Also Sydney's air shed is a far more stressed air shed, with the main sources of pollutants sources from motor vehicles, which are subject to National controls, and wood heaters. In fact, the RIS made no attempt at reviewing the impact of CAR's controls on wood heaters, which seems a major omission. Having the RIS recommend no controls on wood heaters and highly costly controls on industry within the GMR, indicates it fails to consider the facts. ASBG strongly recommends that this and future RISs on air emissions, especially the upcoming Load Based Licensing Review, use a more granular approach, focusing on individual air sheds.

ASBG identified errors within the draft Regulation including:

- The definition of *volatile organic liquid*, which replaced "unless" with "and" erroneously changing the current definition.
- The set points for Pressure-vacuum vents at 15 kPa and -0.5 kPa, can be set higher than the tanks' emergency vent release pressures. Here, Australian Standards and the Australian Institute of Petroleum standards set a design pressure level for atmospheric tanks as a maximum pressure. The drafting of CAR has interpreted the above to mean a minimum pressure level, which is not correct. Hence, atmospheric tanks can have a maximum operating pressure below 15 kPa, yet be required to exceed their design limit via the pressure-vacuum valve set points.

2 SUNSET COSTS TO INDUSTRY UNDERESTIMATED

The upgrade costs from the Group 3 & 4 sunset requirements are grossly under costed in the Regulatory Impact Statement (RIS). ASBG agrees with the RIS that achieving Group 5 will be comparatively small compared to going to Group 6 limits. However, there is a significant cost increase to go from Group 5 to Group 6. In the short time for consultation ASBG has gathered the following evidence that the cost estimations are considerably underestimated, including:

- The RIS uses costs estimates for small boilers to use SCR NO_x removal is based on a 22-year-old US EPA (2000) report which uses 1993 data, which is well out of date.
- A 2016 US EPA report on SRC costings [1] show a much higher cost per tonne of NO_x abated:
    - Table C27 in the RIS states \$2,923/t NO_x abated – based amount
    - Example #1 (US EPA 2016 Report) in section 2.5 provides \$4,934/t NO_x abated[2] (160% higher)
    - Example #2 (US EPA 2016 Report) in section 2.6 provides \$5,743/t NO_x abated (196% higher)
- One ASBG member indicated they alone would need to expend well over double the \$229 million, estimated total cost to NSW industry if they changed 8 emission stacks over to Group 6 limits.
- Other ASBG members are finding that entire boiler replacement is required going to Group 6 limits. Not only is this a large increase in costs over the EPA estimates, the costs do not consider the downtime and lost production required to undertake replacement of major plant, especially where the site has limited space.

Australian costs for US supplied air pollution equipment are also considerably higher than in the more competitive US market. Mark ups, shipping, imported expertise, and any duties add at least 50% to the installed US EPA cost estimates based on verbal discussions with members.

ASBG considers that the abatement costs listed in the RIS are significant underestimates of their real current value. In the past ASBG submissions on EPA RIS calculations on cost of air pollution abatement were then considered too low by at least a factor of 3. It seems this trend continues.

Also the RIS ignored is the multiplier effect from industrial activity. Given the health impact costs are based on extrapolations of health issues over the GMR population, ASBG considers that use of the employment multiplier effect on direct costs to industry is a fairer comparison. Figure 4[3] shows the multiplier effect for various sectors in the USA. By splitting industry into subcategories, the US estimates of the multiplier effect show the impact of increased costs on air pollution control affect the areas of industry, which are in the upper end of the multiplier effect figures.

[1] US EPA Report: Chapter 2 Selective Catalytic Reduction: Health and Environmental Impacts Division Office of Air Quality Planning and Standards U.S. Environmental Protection Agency Research Triangle Park, NC

[2] Adjusted tons to tonnes, \$USD to \$AUD from the report and CPI 2013 to 2022

[3] Updated employment multipliers for the U.S. economy Report By Josh Bivens, January 23, 2019, Economic Policy Institute

Employment multipliers per 100 direct jobs, by major private-sector industry group

Major industry group	Direct jobs	Supplier jobs*	Induced jobs**	Total indirect jobs
Agriculture, forest, fishing, and hunting	100	93.6	134.8	228.5
Mining	100	224.0	166.0	390.0
Utilities	100	515.4	442.2	957.7
Construction	100	88.0	138.1	226.1
Durable manufacturing	100	289.1	454.9	744.1
Nondurable manufacturing	100	184.8	329.5	514.3
Wholesale trade	100	107.3	128.0	235.3
Retail trade	100	46.7	75.4	122.1
Transportation and warehousing	100	112.8	163.3	276.0
Information	100	252.0	321.1	573.1
Finance and insurance	100	149.7	214.7	364.4
Real estate and rental leasing	100	396.6	483.1	879.7
Professional, scientific, and technical services	100	142.1	276.2	418.3
Management of companies	100	144.4	255.4	399.9
Administrative and support services and waste management	100	45.5	89.1	134.5
Educational services	100	63.8	129.9	193.7
Health care and social assistance	100	69.4	136.2	205.6
Arts, entertainment, and recreation	100	123.3	255.2	378.5
Accommodation and food services	100	53.8	107.4	161.2
Other services (except public administration)	100	70.7	139.6	210.3

Figure 1 Employment multiplier effects

From figure 1 the main industry sectors impacted by the Group 3 & 4 sunset are utilities, durable and non-durable manufacturing. The average of these three is a job multiplier of 7.39. However, no multiplier effect is considered in the RIS calculations, which only includes estimated direct equipment costs to local US companies. It is fair to assume the cost impacts of the sunset changes would show up as overall costs, assuming employment is proportional to costs. This is also less of an extrapolation as used in the health impacts. As a consequence, the RIS's costs to industry have been reassessed in table 1.

Table 1 Reviewed summary of the estimated costs and benefits of the regulation for Group 3 & 4 Sunset

Proposal	Costs ($million)	Benefits ($millions)	Net present value ($millions)
Scheduled industry			
– RIS Estimate	$274.1	$895.33	$621.22
Revised Estimate 1^	$822.3	$895.33	$73.0
– Revised Estimate 2#	$2,025.6	$895.33	-$1130.3
Total Revised Estimate	$6,076.8	$895.33	-$5,181.4
^ Using a factor of 3 # Use of the 7.39 multiplier for industrial			

Overall the direct and estimated costs cited by ASBG members is far greater than the RIS cost estimates. In addition, the poor research, potentially cherry picking of US EPA costings, also points to the RIS using a cost estimate far lower than what is realistically to achieve Group 6 criteria. Regardless of the estimated provided in table 1, ASBG considers there is ample evidence that industry costs are grossly underestimated in the RIS. As a

consequence, the industry costing should be redone. ASBG believes reasonable costings are likely to show that going to Group 6 is simply not cost effective, with Group 5 being the more likely outcome.

Recommendation R1:

- ***The RIS to be redone to reflect more realistic and accurate cost impacts on industry.***
- ***RIS should be balanced with proper cost benefit analysis including the impacts of increased unemployment and higher utility costs.***
- ***If moving to Group 6 emission levels are not <u>significantly</u> cost effective, the sunset clause be limited to moving to Group 5 only.***

3 AIR SHEDS USED FOR INDUSTRY SOURCES IN THE RIS

ASBG is concerned the RIS costings for industrial emissions only uses the Greater Metropolitan Region (GMR). EPA created the GMR as simply a rectangle which captures all the major coal power stations from Bayswater in the north west extending to Newcastle in the north east down to Kiama in the south as shown in figure 2:

Figure 2 Definition of GMR, Sydney, Newcastle and Wollongong regions

In past assessments of the CAR the cost impacts and emissions were split into the Sydney Air Shed, and the GMR and for good reasons as the Sydney air shed, especially in the south west is the most stressed. Sydney's air shed is by far the most stressed area in NSW. The following figures[4] show particulate and ozone pollution concentrations in western Sydney area.

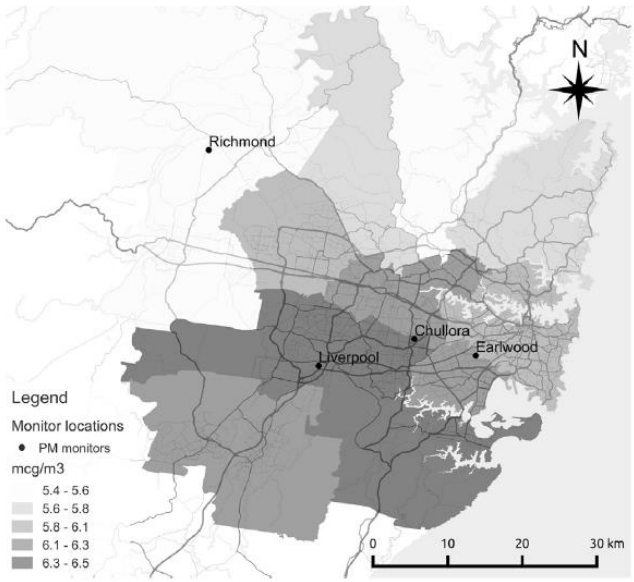


Fig. 2. Interpolated baseline annual average $PM_{2.5}$ concentrations ($\mu g/m^3$) in 2007 by LGA.

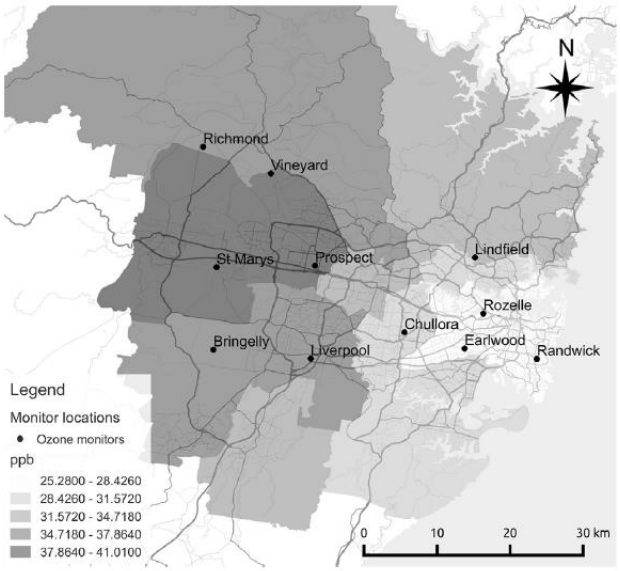


Fig. 4. Interpolated baseline seasonal average of maximum daily one hour average ozone concentrations (ppb) in 2007 by LGA.

Focusing closer, the area around Liverpool and St Marys generally suffers the poorest air pollution in NSW. As a consequence, the Sydney air shed should be the main focus of air pollution reduction policy. However, the RIS places all of industry into the GMR and ignores the Sydney and other air sheds. As a consequence, the changes to CAR are based on broad brush approach lacking in focus and justifying significant tightening of existing industrial emissions, even where they are not supported by a cost benefit analysis, as a result of this lack of granularity.

The missing issue is how much contribution of pollution is there with this area to other air sheds and what impact does this inter-mixing make? Cross contamination between air-sheds must have regard to proper scientific assessment. Fortunately, such work has been undertaken. Past reports[5] on transfer of NO_x/ozone from the Hunter to the Sydney Basin air-shed showed minimal contribution. Chart 4[6] shows the Percentage of time that power stations contribute to ozone concentrations in the Sydney Basin air-shed.

[4] The Health Benefits of Reducing Air Pollution Sydney, Australia, R. Broome, Neal Fann et al, 2015, https://www.researchgate.net/publication/286263491_The_health_benefits_of_reducing_air_pollution_in_Sydney_Australia

[5] Inter-Regional Transport of Air Pollutants Study, Hugh Malfroy paper presented to AEBN's POEO Conference 15 August 2002

[6] NOx Inter-Regional Transport (IRT) Study, CSIRO TAPM modelling 1999

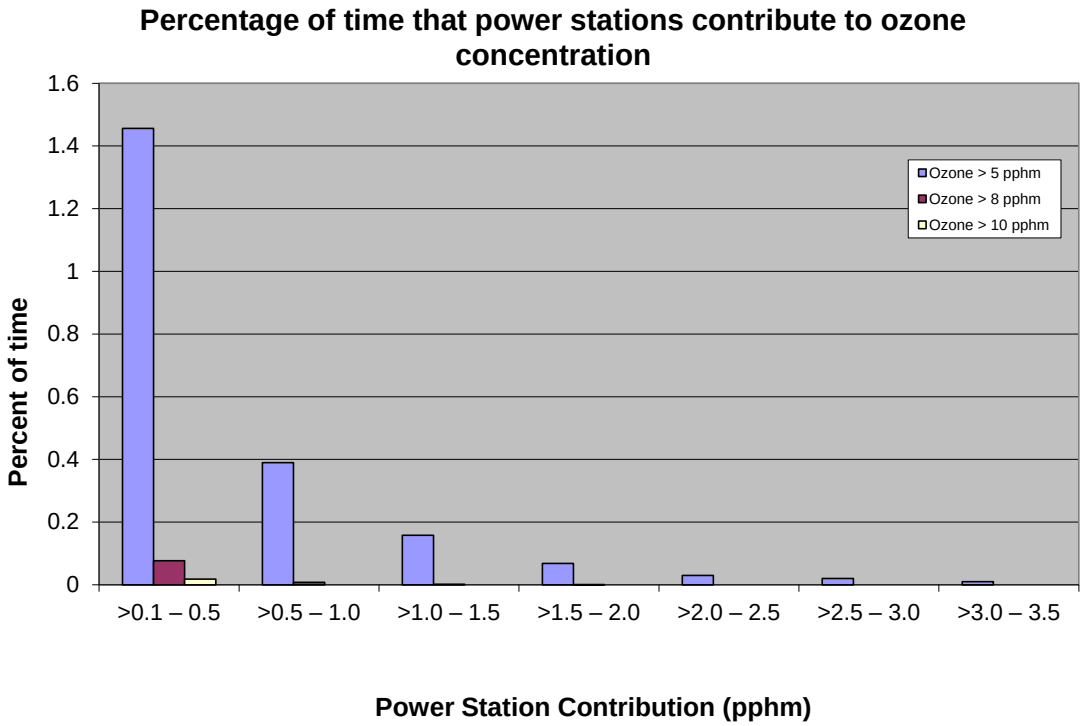


Chart 1 Percentage of time that power stations contribute to ozone concentrations in the Sydney Basin air-shed

Chart 1 shows that the Hunter regional power stations contributed to Sydney's air shed ozone levels approximately 1% for less than 1.4% of the time. Such research clearly demonstrates little inter-regional transport between the Hunter basin and Sydney Basin air-sheds. It also strongly suggests that there are at least two air-sheds in the Greater Metropolitan Region (GMR), and more with limited inter-mixing. In practice Wollongong and Newcastle urban areas are also considered separate air sheds, but this is less commonly used. Further evidence on the misuse of GMR is contained in Chart 2:

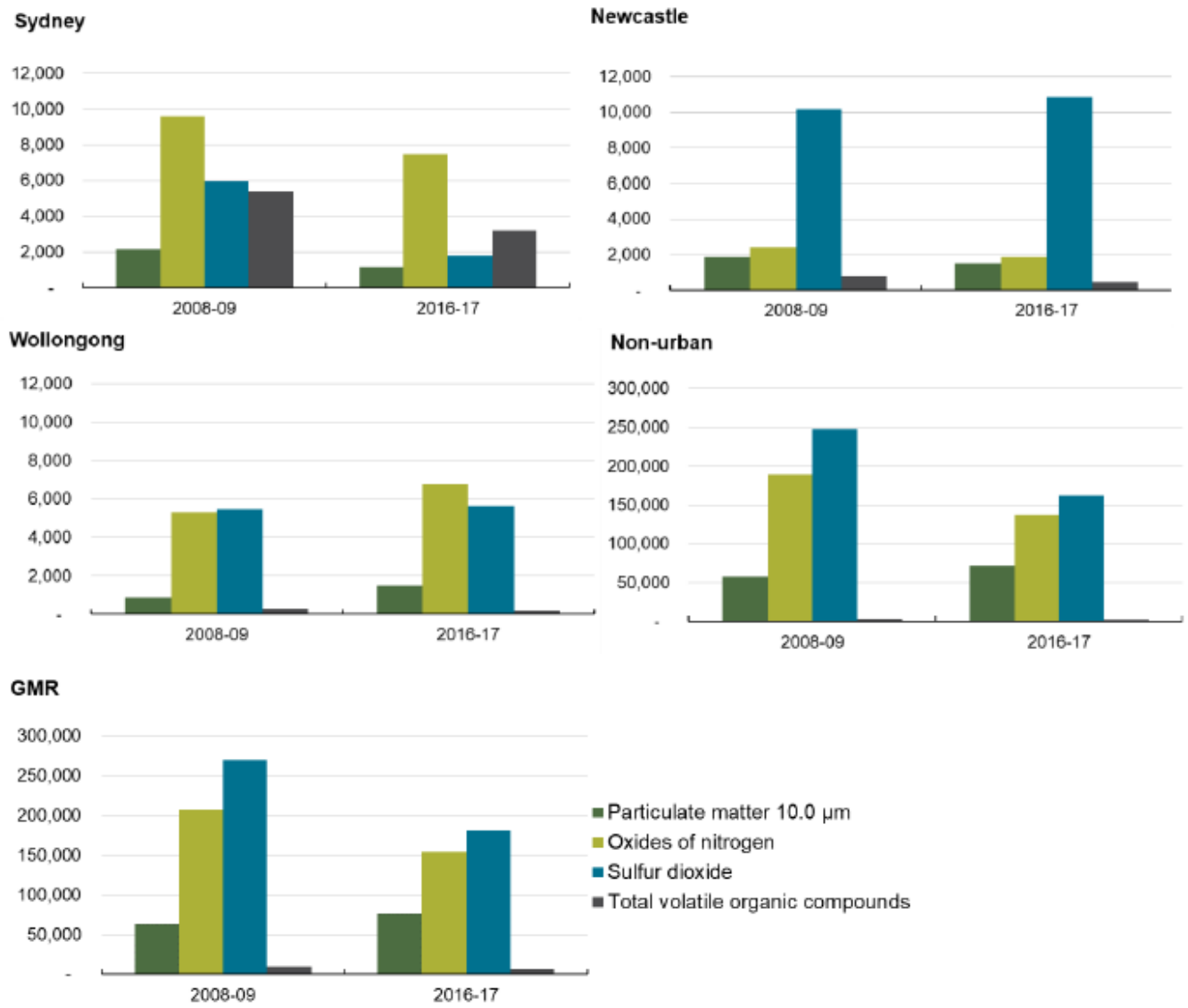


Chart 2: Total industrial facility emissions (tonnes/year) in (a) Sydney, (b) Newcastle, (c) Wollongong, (d) non-urban regions and (e) Greater Metropolitan Region (GMR). µm = micrometers.[7]

Chart 2 was prepared by the Department of Planning Industry and Environment (DPIE), but the authors of the RIS chose to ignore the differences between the air sheds listed and only chose the GMR to represent industry. ASBG considers the use of the GMR as a basis for air pollution health cost impacts was misleading to achieve the EPA's desired conclusions, rather than adopt an independent scientific and evidence based approach.

As Chart 2 clearly shows GMR is not one air shed but multiple. This leads to misleading claims of Sydney's industry e.g. that 53% of Particulate Matter (PM) comes from industry when the bulk comes from coal mining, but these are located in a far less populated area. However, only considering the Sydney air shed industry's PM_{10} contribution was around 30.4% in 2008, with the majority from landfills and quarries, which are not captured under the sun-setting of Groups 3 or 4. Added to this there are many EPA reports and references to the Hunter air-shed and the Sydney air shed which have been considered, studied and reviewed available on-line. ASBG considers it would make for better scientific understanding of air pollution and where its impacts are to separately review the main air sheds captured under the GMR, as has been done in the past. In addition, the RIS uses the Sydney Air shed for justifying the option of not changing the controls on wood heaters, which exceed Sydney's industrial particulate emissions by a considerable margin.

[7] Air Quality Study for the NSW Greater Metropolitan Region, A Sydney Air Quality Study Program Report, DPIE 2020, Figure 25

ASBG considers the current and proposed regulatory controls, heavily targeting industrial sources and lightly deal with other sources major in the Sydney Basin air-shed, such as motor vehicles and wood heaters is flawed. However, the evidence, including Chart 1, of disconnect between the Sydney and Hunter air sheds appears strong. Also as there are no significant air pollution issues in the Hunter air shed, the heavy focus on coal fired power stations is miss-focused. In the Sydney air shed industry is a minor player for Particulate Matter and very small contributor for NO_x and VOCs. Tightening industry's emissions limits will make very small changes to Sydney's overall air quality, but will come at a high cost with little overall change in air pollution levels.

If the NSW Government is serious in addressing the main health issues by better managing the Sydney Basin air-shed, tightening controls on the major sources should be its priority rather than disproportionately increasing controls on Sydney based industrial contributors to poor air quality. ASBG contends the health costs assessments should, at least, be undertaken to include the Sydney Air Shed, preferably increasing its granularity to at least reflect the other air sheds separately.

When the second review of Load Based Licensing (LBL) is undertaken ASBG looks forward to a separate assessment of air sheds. Future RISs which deal with air quality issues, such as the forth coming LBL Review, will need to adopt an increase in granularity to best identify where real improvements in air quality should be placed.

3.1 What Are the Main Sources?

Industrial sources of air pollution are currently tightly controlled and in many cases pay a load tax under the LBL scheme, which is proposed to be further tightened with significant tax increases. In contrast, the main sources of NO_x and PM, motor vehicles and wood heaters, have far lighter to minimal emission controls.

While industry and business are contributors to air pollution, this is diminishing, especially in the Sydney air-shed due to a shrinking industrial sector. It is often said industry should do its share of emissions controls, the facts are that it does most of the heavy lifting and much of the older polluting sites have closed.

Tight air pollution controls make it rather unattractive to install new industrial facilities which generate even small air emissions in the Sydney air-shed. Since 1999 NSW has seen the closure of two oil refineries, flat glass manufacturing site, carbon black manufacturing, a coke production plant, a coal fired power plant, aluminum smelters, cement kilns and the list goes on. This does not include reductions in the capacities of most of the major industrial sites in NSW. As a consequence, there are in the Sydney area far fewer and much lower emitting sites than there were even a few years ago, and the numbers of industry emitters continues to drop.

These charts show the reduction in the emissions of NO_x in the Sydney Basin air shed from 2008 projected to 2036. As shown Sydney industry NO_x emissions are very low contributing 1,200 t NO_x/yr of the total of 32,000 t NOx/yr in the GMR, representing 3.25% of anthrophonic NO_x in the GMR. Motor vehicles make up the vast majority of NO_x emissions in the Sydney air shed, which is the main limiting precursor to ground level ozone formed from photochemical smog.

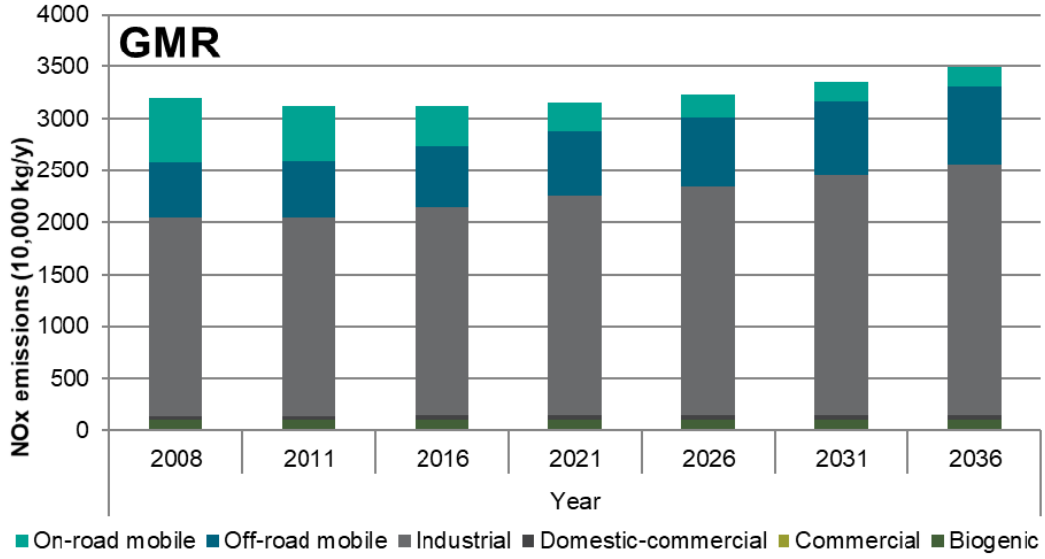


Chart 2 Modelled and projected source contributions for NOx for the GMR[8]

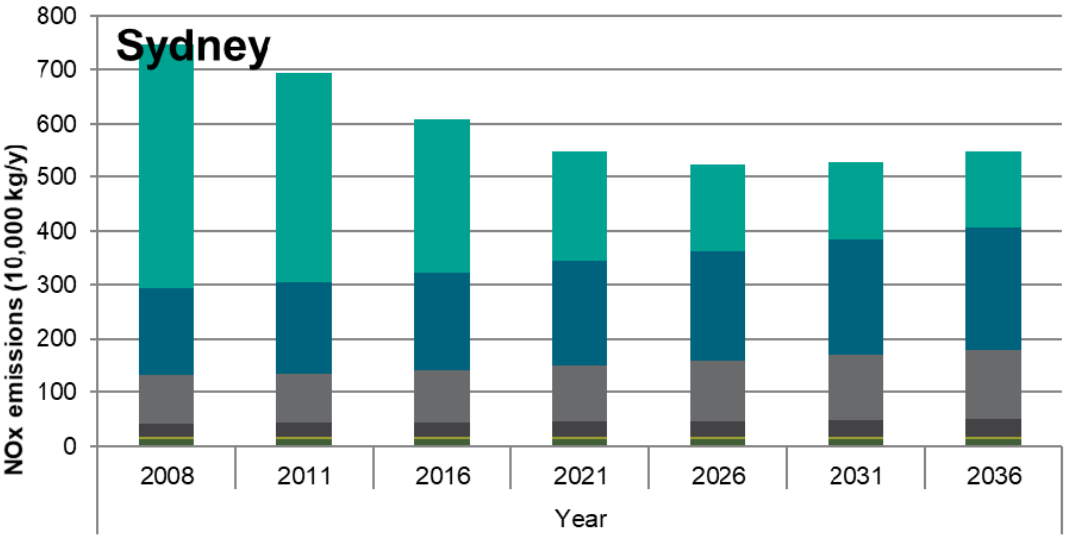


Chart 3 Modelled and projected source contributions for NOx for the Sydney Region

In viewing charts 2 and 3, Sydney industry only contributes ~ 3.5% to the GMR area but when you include the power stations, industry emissions this jumps to about 70% in the GMR. Requiring NO_x reduction, at high cost, on a portion of 3.5% of the problem in the Sydney air shed does not make much sense.

In addition, there are many diffuse sources with are major sources of air pollution including:

- Wood fired heaters
- Motor vehicles
- Other transport
- Hazard reduction burns
- Traffic on dirt roads

[8] Air Quality Study for the NSW Greater Metropolitan Region, A Sydney Air Quality Study Program Report, DPIE 2020

However, none of these are addressed for change in CAR. Even with shrinking industrial activity and their emissions in the Sydney area, ozone levels are expected to continue to slightly rise as shown in Figure 3[9].. This rise is due to a complex set of sources including increased motor vehicle kilometers travelled and spikes from bushfires. Whatever the reasons for these upward trends, industrial emissions are not to blame as they have been declining for many decades and are a minor and decreasing contributor to this issue, yet are the only source subject to both load fees and further concentration restrictions.

ASBG considers there is a double standard where industrial emissions are heavily regulated, but pollution from Government agencies and residents are handled very lightly. Looking at the sources of particulate matter in the most stressed air shed – Sydney, especially around the Liverpool area, finds industrial sources are again very much in the minority. Yet sites holding EPLs are subjected to current and under the LBL Review even further tightening of controls and taxes. Figure 3 *Top* 10 Sources of PM_{10} in Sydney, from the NSW EPA shows, that industrial sources are a minor source around 7.9% in 2014.

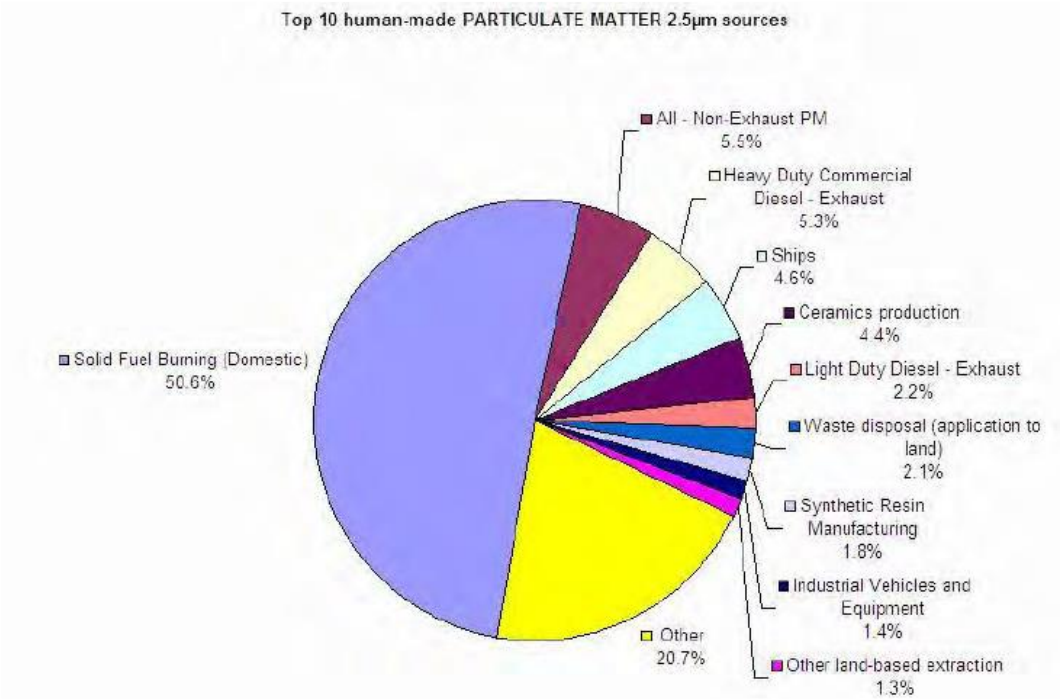


Figure 3 Top 10 Sources of PM_{10} in Sydney[10]

Since then, industrial activity has shrunk, while wood heater pollution has at a minimum kept static, if not risen. Both data show the main source is by far (Domestic) Solid Fuel Burning—wood heaters. NSW has been controlling air emissions on industrial sites since the Clean Air 1961 came into force 55 years ago. However, the Protection of the Environment Operations (Clean Air) Amendment (Solid Fuel Heaters) Regulation 2016 commenced 16 November 2016, so nearly 8 years, yet there is no published data of how effective the wood heater's regulation has been.

Again ASBG finds there is are double standards when comparing the measurement and need for controls between industrial sources and wood heater pollution, especially in the Sydney region, which is also reflected in apparent double standards used in the health costs in the RIS. While ASBG did expect that Group 3 & 4 would

[9] Figure 2 Air Quality Trends in Sydney, Chief Scientist: http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0003/52986/Road-Tunnels_TP02_Air_Quality_Trends_in_Sydney.pdf

[10] Senate Standing Committee On Community Affairs Inquiry Into The Impacts On Health Of Air Quality In Australia – Report from NSW EPA 14/3/14

be subjected to sunset clauses, it also expected additional controls on wood heaters. More concerning is that the health data, especially the Cost of Damage estimates, will be used in the upcoming second Load Based Licensing review. Consequently, the RIS health costs should be redone to separate out the appropriate air sheds, especially the Sydney Air Shed. Sydney based licence holders should not be grouped under GMR, but treated separately. Contributions from the various sources of air pollutants should be properly described, according to each air shed. Action should be taken in proportion to the contribution of health costs, use of Reasonably Available Technologies (RAT) and overall cost impacts of such measures.

Recommendation R2 that future Regulatory Impact Statements on air pollution undertake cost-benefit study based on:

- ***The industry emission sources to be undertaken on a more granular level identifying the specific air shed areas where it is a significant issue and where it is not***
- ***Reduction in air pollutants be based on an evidence, risk based and scientific approach***
- ***Include the measured effectiveness from the 2016 controls on wood heaters and how well these are working to reduce $PM_{2.5}$***
- ***Regulatory actions to focus prioritising actions on:***
    - ***The most stressed areas and air-sheds, especially the Sydney Air Shed***
    - ***The sources of major contributors to air pollution in those areas, including motor vehicles and wood heaters and other source over 1%***
    - ***Appropriate action on each source to improve air quality based on a cost-benefit process***

4 TECHNICAL ISSUES WITH THE REGULATION

4.1 Volatile Organic Liquid

There is a definitional error in the CAR for *Volatile Organic Liquid (VOL):*

> ***volatile organic compound (VOC)***—see Schedule 2, section 1.
> ***volatile organic liquid*** means an organic compound that—
> (a) is liquid in the condition in which it is used or stored, and
> (b) using TM 21 has a true vapour pressure of less than or equal to 3.44 kilopascals.

First contrast consider this definition with the one in the current Clean Air Regulation:

> ***"volatile organic liquid"*** *means any organic compound that exists as a liquid at actual conditions of use or storage, unless it has a true vapour pressure of less than or equal to 25.8mm Hg (0.5 psia).*

The first issue is the CAR uses "*and"* while the current Regulation uses "unless". This changes the meaning of VOL in CAR to mean only VOCs which have a lower vapour pressure of 3.44 kPa (the same as water). However, the current Regulation excludes VOL which have a vapour pressure lower than 25.8 mm Hg (3.44 kPa).

The second issue is that TM 21 is not suited for VOLs with vapour pressures less than 50 kPa and certainly < 40 kPa. Unless the EPA can justify why TM 21 is suitable to assess the lower vapour pressures it should be dropped.

Recommendation R3: The Clean Air Regulation 2022 use the following definition:

> ***"volatile organic liquid" means any organic compound that exists as a liquid at actual conditions of use or storage, unless it has a true vapour pressure of less than or equal to 3.44 kPa (25.8mm Hg or 0.5 psia).***

4.2 Large Tanks and Standards

This is a potential conflict between the pressure-vacuum release valve levels set in the CAR and AS 1940 and other standards.

This involves s91(1) & (2) of CAR which states:

> ***91 Pressure vacuum valves for tank above ground***
> *(1) A small storage tank that is above the ground must have pressure vacuum valves fitted on the atmospheric vents of the tank.*
> *(2) The pressure vacuum valves must be set to be closed when the pressure in the tank is between 15 kilopascals above, and 0.5 kilopascals below, ambient pressure.*

The main issue is the pressure setting requires the tank to be pressurised up to 15 kPa. This may conflict with AS 1940-2017 in the following section:

> ***5.4.7 Setting of pressure-vacuum vents***
> *The settings of any pressure-vacuum vent shall be such that the pressure and vacuum limits, as given in the Standard to which the tank has been designed and tested, are not exceeded.*

For tanks in Categories 4 or 5 designed and tested in accordance with AS 1692, the pressure setting shall be such that the test pressure of the tank is not exceeded under maximum normal venting conditions.
The vacuum setting shall be such that the internal pressure does not fall below a pressure of −0.5 kPa gauge. On such tanks, the setting of the pressure-vacuum vent shall be more than 7 kPa below that of the emergency vent.

Issue 1: The maximum vacuum permitted under AS 1940 is the minimum opening negative pressure under CAR. Tanks of the types specified, are generally not designed to withstand negative pressure. Having a set point at its maximum is considered an implosion risk as vacuum valves operate within a range of tolerance. So a set point of 0.5 kPa gauge may open at lower pressures than tank design limits when including the tolerance range.

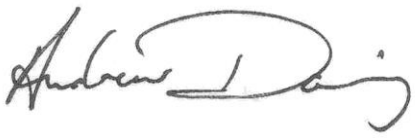
Issue 2: the pressure-vacuum vent is to operate at less than 7 kPa below that of the emergency vent in AS 1940. If the tank's construction has the emergency vent required to be set at less than 22 kPa then there is a conflict between CAR and AS 1940. There is no minimum tank pressure provided for atmospheric tanks under AS 1940. The closest is AIP 650, which sets atmospheric tank design maximum pressure up to 17 kPa. Consequently, atmospheric tanks can be designed to under 17 kPa or under 15 kPa or even lower. Fortunately, CAR does not set a pressure setting for emergency venting, but enforcing CAR could result in the pressure- vacuum valve being set at a higher pressure than the emergency vent release pressure. However, this could conflict with AS 1940 s5.4.7, but tank integrity should prevail from a safety perspective, hence could be ignored.

Almost all Australian tanks are designed to AS 1940 and other referenced Australian Standards, e.g. AS 1692, or to petroleum industry standards, e.g. Chevron Standards. Consequently, requiring a higher standard by a regulation will create errors, potentially costing significantly, including where a new tank must replace the old tank as it does not comply with CAR.

Recommendation R4: That section 91 be reviewed to remove any conflicts it may generate with Australian Standards, an or permit the grandfathering of older tanks to relevant standard used when it was constructed.

Should further details and explanation of the above points be required please contact ASBG.

Yours Sincerely



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