

Submission to NSW EPA on the Review of the load- based licensing scheme

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Submission to the NSW Environmental Protection Agency on the review of the Load-based licensing scheme.¹

Doctors for the Environment Australia (DEA) is an independent voluntary organisation of medical doctors and students who work to address the adverse health effects of environmental damage, pollution and anthropogenic global warming in a broad public health context.

DEA welcomes the opportunity to make a submission to the review of the NSW Load Based Licensing system. The submission will address health aspects of the regulations and how they could be made more effective. Our analysis is consistent with and complementary to the DEA policy on air quality².

Australia has a health problem from air pollution. Even though our air quality is better than in many comparable countries there would be a health gain from reducing current levels of exposure. The best estimate is that air pollution causes 3,000 deaths per year nationally.³ Research published in 2015 using detailed modelling of population distribution and observed PM_{2.5} levels estimated that a 10% reduction in PM_{2.5} for Sydney would, over 10 years, result in 650 (95% confidence interval 430-850) fewer premature deaths, a gain of 3,500 (95% CI: 2300-4600) life-years and about 700 (95% CI: 450-930) fewer respiratory and cardiovascular hospital visits.⁴

Coal-fired power stations (CFPS) are substantial sources of air pollutants. The three main pollutants are sulphur dioxide, SO₂, a mix of nitrogen oxides referred to as NO_x, and particulate matter in the PM₁₀ or PM_{2.5} size range. SO₂ and NO_x are both powerful respiratory irritants, causing asthma, chronic lung disease, and restricted lung growth in children. Fine particle pollution causes similar respiratory problems but is also associated with ischaemic heart disease, lung cancer, and increases in mortality. CFPS also release small quantities of highly toxic mercury.

The pollutants can travel long distances, so even though power stations are located outside cities they are contributing to major city pollution as well as having impacts on the local towns. This has been illustrated in Sydney where research by CSIRO and the Australian Nuclear Science Technology Organisation (ANSTO) showed that half of the sulphate particles at Richmond in western Sydney could be traced back to one of the coal-fired power stations despite these being located 70, 90 and 140 Km away.⁵

Sulphur dioxide is released in large quantities by coal fired power stations. The amount of SO₂ is mostly determined by the coal quality. SO₂ condenses to sulphate particles in the atmosphere, which are a component of PM_{2.5}. NPI figures for Australia show that in 2014-15 the electricity

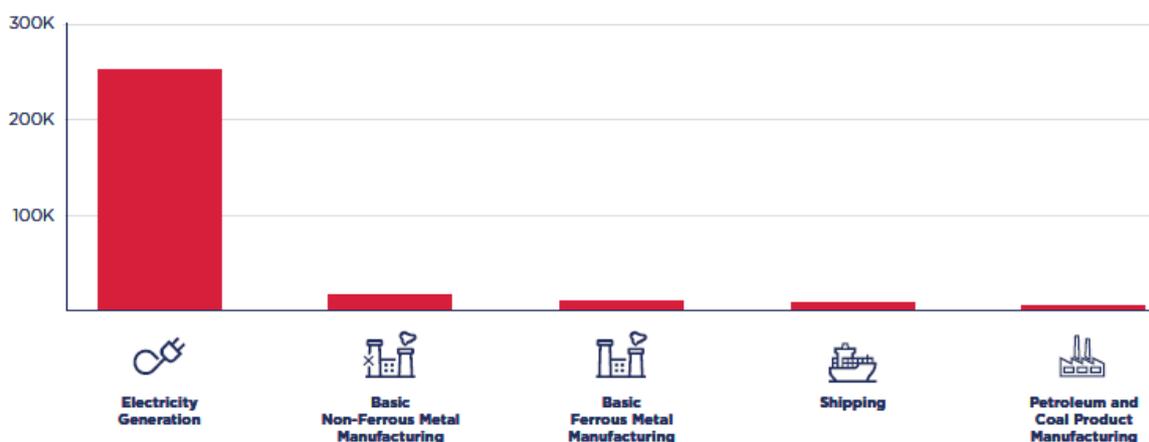
sector released 560,000 tonnes (51%) of the total from all industry of 1,100,00 tonnes.

NOx are released from vehicle exhaust however electricity generation is the dominant source. In 2014 nationally CFPS released 380,000 tonnes, being 52% of all industrial sources.

PM_{2.5} is a subfraction of PM₁₀, the particles regulated in the LBL system. The NPI shows that in 2014-15 CFPS released 8,900 tonnes (29%) out of national 31,000 tonnes from all industry sources.

While the Load-based Licensing system can influence pollution loads from large industrial emitters it cannot influence pollution from distributed sources such as vehicles, shipping, or wood burning home heating, so the proportion of total load from key sources is critical to its success. The following figures from the 'Clean Air for NSW' EPA 2016 consultation paper illustrate the major sources of pollutants for the Sydney greater metropolitan region. In every case, large industrial emitters are the dominant sources.

SO₂ (tonnes/Year)



NO_x (tonnes/Year)

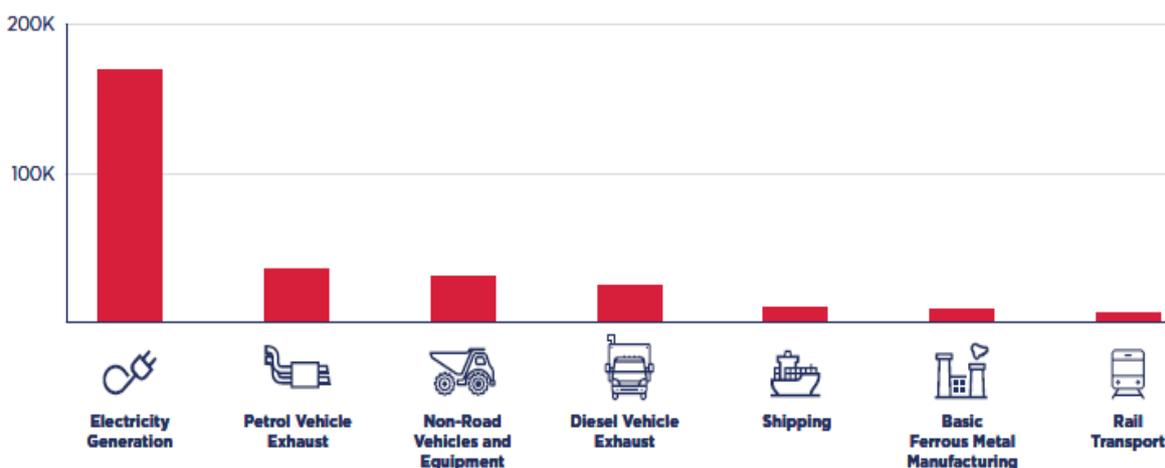
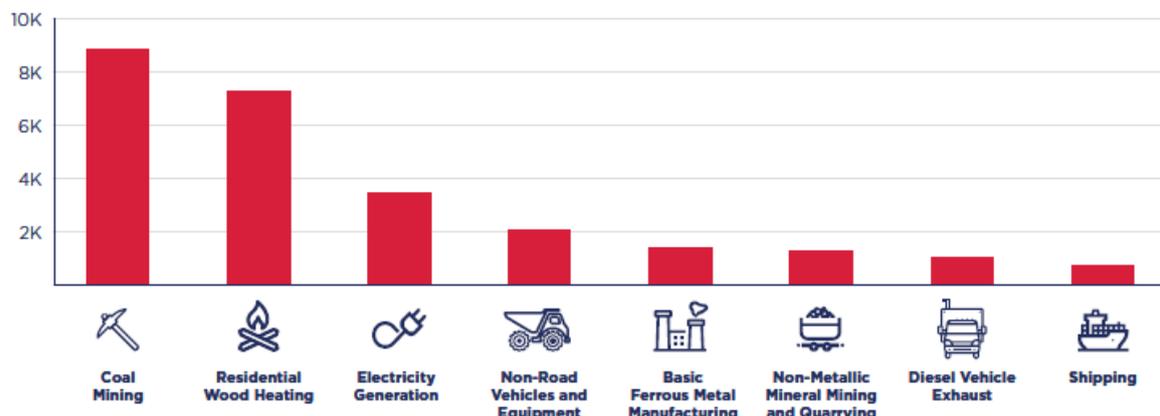


FIGURE 5: TOP DIRECT HUMAN-MADE SOURCES OF PM_{2.5} EMISSIONS (TONNES/YEAR) FOR GMR (EPA 2012)



We believe that community wellbeing will be optimised if the polluter pays principal is implemented, with fees that reflect the health externalities and are high enough to provide an economic incentive to improve processes, select higher quality fuel, or to close poorly performing plant.

The objectives of the NSW Load Based Licensing system

- a) *To provide incentives to reduce the load of pollutants emitted based on the polluter pays principle and to do so within an equitable framework.*
- b) *To reduce pollution (in particular, assessable pollutants) in a cost effective and timely manner.*
- c) *To give industry incentives for ongoing improvements in environmental performance and the adoption of cleaner technologies.*
- d) *To provide incentives that are complementary to existing regulation and education programs for environment protection.*

DEA agrees with these objectives and sees the current review process as an opportunity to improve the capacity of the license system to meet these objectives.

Principles

We agree with the underlying principles that the polluter pays, that the licensing system should be equitable, and should lead to cost effective solutions. We wish to add further underlying principles that the protection of human health is the fundamental motivation for licensing, and that

pollution fees should accurately reflect the health externalities of electricity production.

Associated values are that environmental regulations should be fair and transparent, and stable over time so as to create investment certainty. Fairness dictates that all industries over a certain pollution threshold should be covered by the scheme.

Coverage

The objective to reduce pollution in an equitable way is undermined if substantial polluters are not covered by the scheme. The most glaring example is the mining sector as the biggest emitter of PM_{2.5}, the pollutant for which there is most certainty of health benefit when reductions are achieved. Omitting the mining industry from LBL coverage unfairly leaves other industries paying for pollution while mining gets away free.

Review of the formula

We disagree with the use of a Fee Rate Threshold. As protection of human health is the underlying motivation, and a tonne of pollutant is equally toxic whichever plant it comes from, there is no logical basis for charging different plants different fees per tonne.

The pollutant relativities and zone factors are appropriate.

The unit fee is way too small, and this is the main reason the system is failing to meet its objectives. When we calculate the LBL fee for Bayswater as an example of a typical CFPS, using NPI data for 2014, the fee is 32.95 cents per MWh of electricity produced. With a typical wholesale power price of \$40, that is only 0.82 % of the sale price. (Sources www.npi.gov.au and www.aemo.com.au)

Worked example:

In 2014 Bayswater power station emitted the following air pollutants to generate each MWh of electricity: 4.4 kg SO₂, 2.9 Kg NO_x, 0.06 Kg PM₁₀, 0.000013 Kg Mercury 0.03 Kg Fluoride. These figures are the NPI amounts divided by the AEMO reported generation.

	Amount	Pollutant weighting	Zone weighting	Fee unit value	Fee/MWh cents
SO ₂	4.4	2.2	1	\$44.78	4.3
NO _x	2.9	9	2	\$44.78	23.5
Particulate 10	0.06	125	1	\$44.78	3.4
Mercury	0.000013	110000	1	\$44.78	0.7
Fluoride	0.03	84	1	\$44.78	1.1
Total					32.95

Formula: Amount x weighting x Zone x Fee unit divided by 10,000= fee

What would the correct level of fees be?

The theory of Pigovian taxes proposes that the most efficient level of production will be reached when the pollution fee is equal to the externality cost. Pigovian taxes are measures designed to discourage behaviours or economic activities that harm people or the environment. An example is a tobacco tax designed to reduce the number of people who smoke so as to reduce future health care costs. An externality is a cost of production not reflected in the market price of a product. Externality costs are generally born by society at large rather than the entity doing the production.

Externality costs have been estimated for air pollution from coal fired electricity production in Australia by the Australian Academy of Technological Science and Engineering in 2009, as being \$13 per MWh based only on the effects of three pollutants; SO₂, NO_x and PM₁₀. While there is some uncertainty about this figure, it is based on the best analysis of these costs from Europe, and adjusted for Australia's population density. As it ignores Fluoride and Mercury it may be an underestimate.

We have calculated that based on reported pollution and power output from 2014-15 an externality of \$13 per MWh would be matched by applying a load based licensing pollution fee unit of \$2,192.58 to the five big coal fired generators in NSW. This is 49 times the current fee, and total fees for the five big NSW coal fired generators would be \$687 million.

As it is unlikely that the resultant increase in the price of electricity would be politically popular, the license fees could be recycled to generators in proportion to their output. This strategy has been used in the successful Swedish load based licensing system. In 2014 this would have resulted in net fees and subsidies as shown in the following table:

Power station	Fee or subsidy per GWh of production
Bayswater	-\$3,693.88
Eraring	\$3,425.53
Mt Piper	-\$7,375.48
Liddell	-\$492.34
Vales Point	-\$1,458.74
Zero pollution generator	\$11,582.64

Recommendations

1. That the fee rate threshold be abolished, and there be a flat fee per Kg for each pollutant.
2. That the fee unit be set at the value of \$2,192.58 to reflect the true external cost of pollution, and to allow the system to achieve its objective of creating a financial incentive for improvement.
3. The fee should be brought in over two stages and fixed for 10 year periods to give industry certainty for investment decisions.
4. That negotiation with the other states in the NEM commence, to introduce a similar polluter pays system in VIC, QLD and SA so as to prevent cross border price effects.
5. Mining should be brought into the load based licensing scheme, due to its dominant status as the biggest source of PM₁₀.
6. The use of the revenue raised is a matter for further discussion. It could be used to limit the effect on electricity prices, to fund energy efficiency measures, or to strengthen the electricity transmission network to accommodate the increasing number of low pollution generators.
7. The reporting years for licensing purposes should be synchronised to Australian financial years to simplify public understanding of the data.

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References

¹ <http://www.epa.nsw.gov.au/licensing/lbl/lblreview.htm>

² http://dea.org.au/images/general/DEA_Policy_-_Air_Pollution_v12-16.pdf

³ *The burden of disease and injury in Australia*. S. Begg, T Voss, B.Barker, C.Stephenson, L. Stanley, A.Lopez, Australian institute of Health and Welfare; Canberra. 2007.

⁴ *The health benefits of reducing air pollution in Sydney, Australia*. Richard A. Broome Neal Fan, Tina J. Navin Cristina, Charles Fulcher, Hiep Duc, Geoffrey G. Morgan. Environmental Research 2015;143 part A:19-25

⁵ *Revealing the Sources of Sydney's Air Pollution*. D.Cohen, J. Crawford, E.Stelcer, A Atanacio, ANSTO 2014. <http://www.ansto.gov.au/AboutANSTO/MediaCentre/News/ACS049674>