Submission from A/Prof Graeme Zosky, on behalf of Centre for Air pollution, energy and health Research (CAR)

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Subject: Better fuel for cleaner air draft regulation impact statement

Thank you for the opportunity to comment on the Better fuel for clean air: Draft regulation impact statement. The Centre for Air pollution, energy and health Research (CAR) is a Centre of Research Excellence funded by the National Health and Medical Research Council. CAR brings together over 30 researchers working on how air pollution and new forms of energy affect our health. It supports teams of researchers in the fields of epidemiology, exposure assessment, toxicology, air physics and chemistry, biostatistics and clinical respiratory medicine to pursue collaborative projects and to develop their capacity. We are based in eight of Australia's leading universities.

Vehicle emissions and their health impact is a strong area of study interest for CAR. Given the contribution of vehicle emissions to the total ambient pollutant air-shed, CAR strongly supports any improvements made to reduce vehicle emissions, whether they are policy based, through regulations and statutes, industry or individual practice.

Given that CAR is not focused on the understanding fuel chemistry, or the techniques that are most appropriate for assessing fuel chemistry, we are unable to provide commentary on the validity of the proposed measurement practices as outlined in the Better fuel for clean air: Draft regulation impact statement. We can, however, comment on the health considerations outlined in the document and the implications of fuel regulation in terms of community health and well-being. CAR strongly advocates for any measure that improves fuel combustion emissions due to the clear link between these emissions and health outcomes [1]. In line with this, CAR supports the adoption of regulations that results in the greatest improvements in emissions; this includes 1) reduced sulphur content, 2) increased fuel octane rating and 3) reduced aromatic hydrocarbon emissions. All of these policies are

likely to reduce components of emissions that are direct contributors to the adverse health outcomes associated with exposure to vehicle-derived air pollution.

Consideration of the health impact(s) of emissions in the RIS

In our previous submission in response to the Discussion Paper, which preceded the RIS, we summarised the existing evidence for the link between exposure to vehicle-derived air pollution and adverse health outcomes. In addition to the health impacts we previously identified, we would like to draw attention to a range of further health benefits associated with reductions in fuel emissions that warrant consideration in determining the most appropriate regulatory policy with which to proceed. While it is highlighted in the document that "some of the long-term health benefits associated with reducing tailpipe noxious emissions, particularly some cancers associated with ultrafine particulate emissions (<PM1)", there are range of additional health outcomes that are not considered. These include, but are not limited to, the neurodevelopment effects of early life exposure to exhaust emissions [2] and data linking exposure to air pollution with the development and exacerbation of Type 2 diabetes [2]. Given that impaired cognitive function with aging [3] and Type 2 diabetes [4] are among the greatest public health challenges in Australia moving forward, the cost savings associated with improvements in vehicle emissions outlined in the document are likely to be gross underestimates of the financial and social benefit of more stringent regulations.

The potential health impacts of biodiesel and E85 fuel

As emerging fuels in the economy, and noting that current regulatory frameworks are insufficient, CAR supports regulation and standardisation of biodiesel and E85 fuels in the Australia context. We note that part of the impetus for this change is to align fuels with in-built emission controls in newer vehicles and we further advocate for these changes if they reduce emissions; particularly sulfur, nitric oxide, volatile organic compounds (VOCs) and particulate matter (PM). However, care must be taken to ensure that targeted reductions in emissions based on a specific parameter, such as the proposed reductions in sulfur content, do not cause adverse increases in other emission characteristics. This is particularly true for biodiesel and E85 fuel where we know that there may be improvements in sulfur and NOx production [5] however, combustion of these fuels under standard operating conditions can increase the proportion of fine and ultra-fine particles that are produced [5]. So, while a reduction in sulfur and NOx production may have health benefits, these may be offset by the increased and unintended health risks of an increase in one of the other emission parameters.

References

1. Landrigan, P.J., et al., *The Lancet Commission on pollution and health.* The Lancet, 2017. **391**: p. 462-512.
2. Chiu, Y.H., et al., *Prenatal particulate air pollution and neurodevelopment in urban children: examining senstivie windows and sex-specific associations.* Environment International, 2016. **87**: p. 56-65.
3. Brown, L., E. Hansnata, and H.A. La, *Dementia in Australia 2016-2056.* NATSEM - Institute for Governance and Policy Analysis, 2017. **University of Canberra**.
4. Chen, L., D.J. Magliano, and P.Z. Zimmet, *The worldwide epidemiology of type 2 diabetes mellitus - present and future perspectives.* Nature Reviews Endocrinology, 2012. **8**: p. 228-236.
5. Dincer, K., *Lower emissions from biodiesel combustion.* Energy Sources, Part A: Recovery, Utilization, and Environmental Effects, 2008. **30**: p. 963-968.