Response from Robert Bosch (Australia) Pty Ltd

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Vehicle Emissions Working Group
Department of Infrastructure and Regional Development
GPO Box 594, CANBERRA ACT 2601

10 March 2017

Re: Improving the efficiency of new light vehicles – draft Regulation Impact Statement, December 2016

To whom it may concern,

Robert Bosch (Australia) Pty Ltd (BOSCH) supports the Government's initiative of improving vehicle fuel efficiency as a key element of its commitment to reducing Australia's greenhouse gas emissions and welcomes the opportunity to provide input to the Australian Government Ministerial Forum.

As a major supplier to automotive vehicle manufacturers worldwide, Bosch has experience and knowledge regarding systems for fuel delivery, control of combustion, engine efficiency and treatment of exhaust gas pollutants for gasoline, diesel and alternative fuelled engines.

Key messages

- Fuel efficiency (CO_2) standards supported
- Technology costs recovered by fuel savings
- Low sulfur, high octane petrol recommended
- Encouragement of off-cycle emissions saving technologies supported

Fuel efficiency standards and associated technology costs

Bosch supports legislated fuel efficiency standards for reduced fuel consumption and exhaust carbon dioxide (CO_2) emissions from vehicles. Costs recovered by fuel savings

Bosch supports improvement of vehicle fuel efficiency, including continued development of combustion engines for cost effective reduction of fuel consumption and CO_2 emissions. In other markets where limits on fuel consumption and CO_2 emissions have been legislated, suppliers and vehicle

manufacturers have worked together to deliver high technology vehicle on-board solutions at a cost acceptable to the market. As final end-customer product specifications and pricing strategies are entirely at the discretion of vehicle manufacturers, Bosch is not in a position to confirm cost impacts for specific technologies but in our experience vehicle manufacturers have been able to introduce such technology at a price premium able to be recovered by fuel cost savings within an initial customer ownership period. We therefore agree with the findings of the Bureau of Infrastructure, Transport and Regional Economics' cost-benefit analysis that costs of meeting CO_2 reduction targets can be more than offset by fuel savings over the operating life of a vehicle.

Fuel quality as an enabler of CO_2 reduction

Bosch recommends lower sulfur, high octane petrol; harmonisation with EU fuel standards

Certain vehicle fuel consumption and CO_2 reduction technologies require higher quality fuel than that allowed within the current Australian standards. While Australia's diesel fuel quality for road vehicles is close to that of leading markets, our petrol standards lag and is an impediment to realizing the potential of certain available technologies. For example, improved fuel economy and CO_2 reduction can be achieved via smaller displacement engines running turbochargers at high boost pressures but if the fuel octane is not sufficiently high, the on-board engine management system will automatically adjust ignition timing to protect the engine from internal damage, resulting in lower performance and higher fuel consumption/CO_2 emissions. Australia is particularly susceptible to this phenomenon due to its warm climate to which the aforementioned technology is especially sensitive. A further example relates to the use of particulate filters and filters for oxides of nitrogen (NO_x) used with high efficiency gasoline direct injection (GDI) engines. These filters are very sensitive to the levels of sulfur in fuel and vehicle on-board management strategies for tolerating high sulfur can diminish the fuel efficiency gains possible. For these reasons, Bosch recommends harmonising Australian standards with the leading international fuel standards for which the technology is designed. In particular, European Union (EU) fuel standards are an exemplar.

Encouragement of real-world emissions savings technologies

Bosch supports encouragement of technologies that reduce real world fuel consumption/CO_2 emissions, including 'off-cycle' technologies

There are existing and new emerging technologies that can significantly impact real world emissions and fuel consumption but have only limited or no influence during official 'on-cycle' laboratory testing. While acknowledging the migration of the EU toward the Worldwide Harmonized Light Vehicles Test Procedure

(WLTP) slated for 2020 will be an improvement over the current regime, the continuing trend of population urbanization and its inherent transport infrastructure challenges for Australia means traffic congestion in major centres will continue to generate real-world emissions disparate to the official laboratory test cycle.

Certain emerging technologies such as vehicle-to-vehicle and vehicle-to-infrastructure communication will enable strategies that directly influence real world on-road emissions and fuel consumption. They will be most influential in heavy or congested traffic yet have no impact on a laboratory test result. Other technologies such as idle-stop/start have some influence on a standard laboratory test cycle result but have increasing value in real world driving proportional to the level of traffic congestion. Bosch believes adoption of such technologies should be encouraged but without inclusion in a legislated fuel efficiency standard, vehicle manufacturers will be less compelled to pursue them.

We do not have a strong preference regarding the form any encouragement for emissions savings technologies should take other than to agree with the concerns raised in the draft RIS that such schemes should not favour adoption of specific technologies that would inhibit market competition or new technology innovation. In our opinion combustion engines, exhaust treatment solutions, low carbon fuels, energy storage devices, hybrid and electric drives and other technologies should all compete on an equal footing. To this end Bosch supports the Department's proposal for an underlying CO_2 grams/km basis of measure for a vehicle fuel efficiency standard and inclusion of recognition and encouragement for 'off-cycle' emissions savings technologies.

We would be happy to support the Working Group or the Ministerial Forum with additional information should any of the above require further clarification.

Yours sincerely,

[redacted]

Matt Turner
Technical Specialist – Automotive Powertrain Systems
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Bosch has had a presence in Australia since 1907, opening its first wholly owned subsidiary, Robert Bosch (Australia) Pty Ltd in 1954. Bosch generates revenues of more than 750 million Australian dollars per annum in Oceania, and employs over 1,400 associates. Our regional activities are operated through six wholly owned subsidiary companies and cover a diverse range of businesses including household appliances, security technology, power tools and accessories, engineering services and contract manufacturing, parts and equipment for automotive workshops and motorsport enthusiasts, franchised car servicing, equipment, services and solutions for manufacturers, drives and control technology, software innovations, hot water and heating systems, packaging technologies and service support for Bosch equipped eBikes.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 390,000 associates worldwide (as of December 31, 2016). According to preliminary figures, the company generated sales of 73.1 billion euros in 2016. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected industry. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to create solutions for a connected life, and to improve quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 450 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At 120 locations across the globe, Bosch employs 59,000 associates in research and development.

The company was set up in Stuttgart in 1886 by Robert Bosch (1861-1942) as "Workshop for Precision Mechanics and Electrical Engineering." The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant up-front investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch GmbH.