Re: Light Vehicle CO2 Emissions Standards for Australia

Better Place welcomes the opportunity to contribute to the development of the proposed Light Vehicle CO2 Emissions Standards for Australia.

In recent years there has been rapid development in the electric vehicles sector: technology performance is improving, costs are decreasing and more electric car models are becoming available on the market. Globally, governments, car manufacturers, capital markets and customers have moved decisively in favour of electric vehicles, and there is a clear international consensus that the future of transport is electric.

In order for Australia to enjoy the benefits that electric cars present, it is imperative that measures to support their introduction are introduced. We have attached a short submission outlining some of the ways in which the Light Vehicle CO2 Emissions Standards can support the adoption of electric cars in Australia. Specifically, we recommend that Australia adopts a bonus credit arrangement for electric cars to encourage their introduction to the Australian market.

Better Place is the world’s leading electric car network company and has raised over US$750M in venture capital in the last 3 years. In November this year, Better Place finalised its C Series funding that included new investors such as UBS and GE. The company works with all parts of the transportation ecosystem, including automakers, battery suppliers, energy companies, and the public sector and therefore has a detailed and up-to-date knowledge of global developments in this rapidly moving space.

Of Better Place’s announced roll-outs, Australia is currently the largest (including Denmark and Israel). Better Place also recently announced its intention to expand the network from Denmark through Western Europe. With partial deployments also announced in Japan, the US and Canada, Australia is at the forefront of the global transformation from petrol to electric vehicles.

Better Place has begun rolling out the necessary charging infrastructure by the end of 2011 in Canberra, with the national rollout commencing in 2012.
We look forward to continuing to engage with the Department of Infrastructure and Transport in the development of this standard. If you require any further information or clarification about our submission, please do not hesitate to contact our office.

Yours sincerely

Alison Terry
Head of Automotive and Corporate Affairs
Summary of recommendations

This submission details the substantial environmental benefits offered by electric cars, and proposes credit arrangements within the Light Vehicle CO2 Emissions Standard for Australia to encourage their introduction the Australian vehicle market. Specifically we recommend:

1. Recognition should be given to the substantial benefits, and superior environmental performance, of electric cars
2. This recognition should occur within the context of the Emissions Standard, until such time as this may be reviewed in the context of future policy arrangements
3. It should be acknowledged that the fuel of electric cars are subject to the carbon price, while petrol and diesel for passenger and light commercial vehicles is not
4. Bonus credit arrangements for zero-emissions vehicles should be incorporated within the Light Vehicle CO2 Emissions Standard for Australia

About Better Place

Better Place delivers the network and services that make an electric car affordable to buy and easy to use. Electric car drivers will have access to a network of charge spots, battery switch stations and systems that optimise the driving experience and minimise environmental impact and cost.

Better Place provides a personal charge spot at home, access to a network of charge spots at work and in public, access to “instant recharge” through battery switch stations and in-car services to help drivers know when and where to recharge.

The ability to be continuously recharging, or ‘topping up’ the battery in their car is important in reassuring drivers that they will never run out of energy while on the road. In addition, for those circumstances where the driver doesn’t want to wait to recharge, they can use our network of battery switch stations for range extension.

Benefits of electric cars

The benefits delivered by electric vehicles are now widely recognised. When powered by renewable energy, electric cars will significantly reduce national greenhouse gas emissions and local toxic exhaust pollution, while providing households with affordable transport options. These benefits have been recognised by governments around the world, who have accordingly taken aggressive action on a range of fronts to accelerate the transition to an electric fleet.

In recent years there has been rapid development in the electric vehicles sector globally: technology performance is improving, costs are decreasing and more electric car models are becoming available on the market. In addition to various governments’ actions, car manufacturers, capital markets and customers have all moved decisively in favour of electric vehicles, and there is a clear international consensus that the future of transport is electric.

The main benefits that electric cars offer are discussed in greater detail below.
**Electric cars offer significant CO2 emissions reductions possibilities**

Electric vehicles have the potential to significantly reduce carbon dioxide emissions from the transport sector, and for the purposes of this standard will be considered zero-emissions vehicles.

If charged with 100% renewable power – which is a commitment made by Better Place to all of its subscribers – electric cars offers zero emissions driving from well to wheel. Other electric car infrastructure providers are also providing the service of 100% renewable energy recharge. Electric cars therefore offer an unparalleled opportunity to displace carbon emissions from the road transport sector.

The Government now has a range of policies in place aimed at reducing the emissions intensity of electricity generation in Australia, the carbon emissions trading scheme and the Renewable Energy Target being of most significance. This means that even the emissions from new electric cars that are not charged using renewable energy, once in-service, will fall over time.

The reduction in emissions intensity from electricity generation will directly lead to a reduction in upstream emissions of electric cars, without any further changes to the vehicle stock. This is at odds with the situation faced by internal combustion engine vehicles. The average age of a car currently on the road in Australia is 10 years. This means that a petrol car with a given fuel efficiency purchased in 2012 is likely to still be on the road in at least 2022, retaining the same fuel efficiency and related emissions throughout that whole period of time. In fact, as petrol cars age, their on-road emissions are likely to increase, as their real-world fuel consumption worsens with poor maintenance, among other factors.

In addition, as noted above, electric cars will have the ability to reduce their on-road emissions throughout their life time, not just through the turnover of the fleet, an opportunity that does not exist for the conventional petrol powered car.

**Electric cars can facilitate lower emissions from the stationary energy sector**

In addition to simply reducing transport related emissions, it is critical to note that electric vehicles have the potential to support the introduction of increased levels of renewable electricity generation, which will aid the reduction of emissions from the stationary energy sector.

The storage opportunity of electric car batteries makes the electric fleet optimal customers for intermittent renewable generators. Unlike nearly every other electrical appliance, electric vehicles do not instantly use the energy they draw, but store it for when it is needed later. Given most cars are parked more than 20 hours a day and usually plug in when their battery is only slightly (less than 25%) depleted, electric car charge network operators have a great deal of flexibility as to when the cars draw power.
Matching variable renewable energy generation
With an intelligent charging network, the amount of power flowing into a portfolio of electric vehicles while they are plugged in can be coordinated to match the variable output of renewable generation plants such as wind farms, without compromising on drivers’ needs or flexibility. This storage benefit allows an increase in the total level of intermittent renewable production above the level that could otherwise be dispatched. This matching capacity is also of value to renewable generators as it means they do not have to pay to secure reserve supplies from generators in the market (typically gas-fired peaking plants) to cover the periods when their plants are not producing electricity.

Electric car charge network operators such as Better Place have committed to provide their customers with 100% renewable electricity and will sign long-term off-take agreements with renewable power plant developers. It is important to note that electric vehicle network operators can make this commitment to green energy as the cost of renewable energy to drive electric is still substantially less (per kilometre) than petrol and represents only a small increment on operating costs compared to the grid average. In order to secure finance for their new plants, developers of renewable energy projects often sign power purchase agreements underpinning the majority of the revenues of the plant over the medium to long term. Electric car charge networks are ideally placed to sign these agreements because they need to secure reliable supplies of 100% renewable electricity for their customers’ charging needs.

Emergence of Vehicle- and Battery-to-Grid services
Further opportunities to use electric cars to reduce stationary energy emissions exist, including using the cars’ used batteries for storage.

Batteries will generally be withdrawn from service in an electric vehicle when their capacity falls below 80% of the original. Nevertheless, they remain serviceable batteries and much less expensive than other storage options currently available. Electricity from variable wind or solar renewable generators can thus be stored in used car batteries and then be fed back into the grid in a coordinated manner, allowing renewable energy to effectively be dispatched on demand and earn stronger revenues as a result.

In the longer term, it is expected that manufacturers of electric vehicles will introduce technology that enables the cars to feed energy from their batteries to the grid (vehicle-to-grid or “V2G”), making this service available throughout the life of the battery. While V2G would only use the top 10-15% of charge in an electric car’s battery, aggregated over a large fleet of cars this is a substantial amount of electricity.

The emergence of V2G is expected to further accelerate the penetration of renewable electricity generators. A study of US grid capacity expansion at the National Renewable Energy Laboratory in 2006 has shown that electric cars with V2G could more-than-double the amount of wind energy capacity installed through the provision of services including frequency control, voltage support and standby reserve.

A study by Curtin University found that through V2G ancillary services, the distributed batteries in 1 million electric vehicles could enable the generation of almost 45,000GWh of
renewable electricity in Australia. This would be the equivalent to doubling the Federal Government’s Renewable Energy Target and would represent a tenfold emissions reduction over those achieved simply via fuel substitution.

**Electric cars reduce harmful urban air pollution**

The transition to electric vehicles will not only considerably reduce carbon emissions from the transport sector and assist in the efforts to mitigate climate change, but will also eliminate toxic exhaust pollutants from our cities, making them cleaner, healthier places to live and work.

Petrol and diesel vehicles are the sources of a range of different toxic air pollutants currently existing in our cities, including carbon monoxide (CO), volatile organic compounds (VOCs), nitrogen oxides (NOx), sulphur oxides (SOx) and particulate matter (PM). These pollutants contribute to smog formation, poor urban air quality and health problems, particularly respiratory illnesses.

The two main air pollution problems of primary concerns in cities are photochemical smog (ozone at ground level) and fine particle pollution. Despite the introduction of cleaner vehicles and fuels, these pollutants have shown no overall decline since the 1990s and motor vehicles will remain a main source of air pollution in Australian cities as they continue to grow and the number of vehicles on the roads increase.

Because they can be inhaled deeply into the lungs, fine particles are a principal concern to human health. Exposure to these pollutants may aggravate respiratory and cardiovascular illnesses such as bronchitis, pneumonia and asthma. Despite having better fuel economy and lower carbon dioxide emissions than petrol cars, diesel cars emit substantially more particle pollution than petrol engines. As toxic air contaminants, fine diesel particles have been found to cause cancer, premature deaths and other health problems. Therefore, if a CO₂ standard accelerates the trend towards diesel vehicles, air quality and non-CO₂ emissions performance may deteriorate considerably.

Stricter emissions standards have reduced the toxic pollutants emitted by internal combustion engine vehicles; however only electric cars can completely eliminate toxic exhaust emissions and the urban air pollution caused by the passenger transport sector. While the proposed CO₂ standards do not directly deal with non-CO₂ emissions, improved air quality will be an important co-benefit to be considered.

**Electric cars present an affordable alternative to petrol cars**

The improved fuel efficiency being induced by more stringent emissions standards across the globe will see manufacturing costs of conventional internal combustion engine vehicles increase over time. Forecasts place the typical annual increase in ICE powertrain cost to meet regulatory and customer requirements at 3-4% per year. The cost of manufacturing electric cars, on the other hand, is projected to decrease over time, due to economies of scale from rising production volumes.

Rising oil prices, comparatively cheaper electricity prices, superior drivetrain efficiency and the existence of battery finance make electric cars a real and affordable option for drivers.
In its World Energy Outlook 2010, the International Energy Agency (IEA) claims that “the age of cheap oil is over” and cautions oil prices could potentially exceed US$200 in 2035 due to growing demand from China and other emerging economies.\textsuperscript{ix} The Agency says future oil prices are dependent on the degree of climate change policy action by governments and models three different scenarios yielding oil prices of US $85, $117 and $138 (averaging at US$113) respectively in 2035.\textsuperscript{x}

Electric cars face a lower, and less volatile, fuel cost than conventional internal combustion engine vehicles. The average electric car costs 2-3c per kilometre in fuel (electricity), while the average petrol car costs 10-15c/km.

The main additional cost is due the cost of the battery. The “sticker-price-shock” experienced by consumers due to the fact that a relatively greater proportion of the total cost of ownership of electric cars is in capital (namely the battery) can be overcome by battery financing, which in Better Place’s case involves separating the ownership of the battery from the ownership of the car. It is Better Place’s revolutionary battery swapping model that allows this separation of ownership. Electric car owners are charged a monthly subscription for access to and use of the portfolio of batteries. This solution relieves the customers of the up-front battery cost and perceived ownership risk, which is present in the face of rapidly improving technology development. The cost and risk is instead placed in the hands of a portfolio manager of batteries, who can extract maximum economic value from the battery over the life of the asset.

**Light Vehicle CO$_2$ Emission Standards for Australia**

Better Place welcomes the introduction of mandatory carbon dioxide emissions standards for light vehicles in Australia. Given the contribution to total emissions by the transport sector, and the exclusion of petrol from the Government’s carbon pricing scheme, complementary measures to limit emissions from the light vehicle fleet will be necessary if the Government is to be able to meet its national emissions reductions target.

Schemes implemented in Europe, the United States and individual states such as the initiative led by California show that light vehicle carbon dioxide emission standards are effective and achievable. Similarly, the early achievement of the voluntary standards set by the Federal Chamber of Automotive Industries shows that Australia is well and truly up to the challenge of meeting more ambitious targets.

The targets under the different scenarios presented in the Discussion Paper ranges from 183 to 190 g/km in 2015, 141-156 g/km in 2020 and 155 g/km in 2024. It is important that the target eventually set by the Government is ambitious but realistic, so as to achieve real reductions in emissions from the transport sector in Australia.

In order to ensure that emissions standards are in fact met, and emission reductions achieved, the compliance mechanism to go with the standard needs to be strong.
In the European Union, car manufacturers who do not meet their average CO$_2$ targets must pay an “excess emissions premium”. The total penalty a manufacturer needs to pay is calculated according to the positive number of grams per kilometre by which the manufacturer’s average specific emissions exceeded its specific emissions target, the number of new passenger cars produced and registered by that manufacturer in that year, and the penalty amount for the year in question.\textsuperscript{xi} From 2012 to 2018 the penalties are €5 per vehicle for the first g/km of CO$_2$; €15 for the second gram; €25 for the third gram; and €95 from the fourth gram onwards. From 2019, a ‘flat rate’ penalty of €95 for each g/km exceeding the target applies.\textsuperscript{xii}

Under the US Corporate Average Fuel Economy Scheme, manufactures whose fleets fail to meet the CAFE standards are liable for a civil penalty of $5.50 per each tenth of a mpg under the target value times the total volume of vehicles manufactured for a given model year.\textsuperscript{xiii}

Compliance with the standard should always be preferred to the payment of penalties, and as such any incentives to merely pay the penalty rather than comply with the standard should be avoided.

**Electric cars under the Australian Emissions Standards**

Better Place supports additional incentives for automakers to bring electric cars to market in Australia under the proposed emissions standards scheme for three main reasons, discussed below. As such, we make the following recommendations:

1. **Recognition should be given to the substantial benefits, and superior environmental performance, of electric cars**

   Firstly, as evident from the discussion about benefits of electric cars in the introduction of this submission, the transition to an electric car fleet offers emissions reductions opportunities far greater than what could ever be achieved with even the most stringent emission reductions targets for conventional petrol powered cars. In addition to reducing overall carbon emissions from the transport sector, they also eliminate toxic exhaust pollutants from our cities. This superior environmental performance should be recognised through special treatment of electric cars under an emissions standard scheme.

2. **This recognition should occur within the context of the Emissions Standard, until such time as this may be reviewed in the context of future policy arrangements**

   Second, the Discussion Paper appears to suggest that advanced technology vehicles would be more appropriately promoted by separate policies outside the CO$_2$ standard. Again, given the range of benefits of electric cars, such incentives would indeed be appropriate. Unfortunately no such complementary policies yet exist in Australia, and therefore a special recognition under an emissions standards scheme is required. Given this is the primary policy tool being deployed for the purpose of reducing carbon emissions from the light vehicle fleet and the transport sector, it is appropriate that this occur within the Standard itself.
3. **The fuel of electric cars are subject to the carbon price, while petrol and diesel for passenger and light commercial vehicles is not**

Attention needs to be brought to the discriminatory treatment of vehicle alternatives under the Government’s proposed carbon price. Petrol as a transport fuel source has been excluded from the carbon tax, and the future emissions trading scheme. The electricity industry is however included, meaning electric cars will in fact be disadvantaged relatively to conventional internal combustion engine vehicles. As such, in order to rightly rate vehicles with regards to their environmental performance, special credit arrangements should apply to electric cars under the emissions standards scheme.

4. **Bonus credit arrangements for zero-emissions vehicles should be incorporated within the Light Vehicle CO2 Emissions Standard for Australia**

Zero emissions vehicles are attractive to manufacturers under a corporate fleet average type of scheme, as they will significantly lower the average across the whole car fleet. Under the European emissions standard, electric vehicles are rewarded so-called ‘super credits’. An electric car will be counted as 3.5 zero emissions vehicles in 2013, 2.5 in 2014 and 1.5 in 2015, after which the bonus credit scheme will be reviewed.

It is suggested that Australia adopts a similar bonus credit arrangement for electric cars in their Light Vehicle CO2 Emission Standards. A phase out period like the one proposed in Europe is reasonable, as long as the bonus credit duration is long enough to have a real and considerable impact on car makers’ future plans. With the lack of other policies promoting electric cars, this seems to be a reasonable first step for Australia to start reaping the full range of benefits that electric cars offer.


http://www.udel.edu/V2G/KempTom-V2G-Implementation05.PDF

http://sustainability.curtin.edu.au/local/docs/0907_Environmental_Attributes_EVs_Australia.pdf


ix Reuters November 2010. ‘UPDATE 3-IEA sees oil supply peak looming, raises price outlook’.
http://www.reuters.com/article/idUKLDE6A70S520101109?pageNumber=1


http://www.dieselnet.com/standards/eu/ggh.php