

Submission to
Department of Infrastructure, Transport, Regional Development and
Communications

re
The Fuel Efficiency Standard – Cleaner, Cheaper to Run Cars for
Australia

Consultation paper, 19 April 2023

from Derek Bolton, 30 May 2023

Summary

A fatal flaw

We find that setting the permitted emissions for a vehicle to be roughly in proportion to the mass of the unladen vehicle is fundamentally flawed. Most obviously, it creates no incentive to use lighter materials.

Useful work

The central principle should be to minimise the emissions per unit of useful work done (emissions intensity).

Timeliness

Avoiding one tonne of emissions now is more beneficial than avoiding one tonne in a year hence.

Responses to questions posed

Q. "Are there other principles that you think we should keep in mind?"

1. We note that the effectiveness principle reads:

"Effective in reducing transport emissions from light vehicles."

It needs to be effective in reducing overall emissions. In particular, it needs to avoid distorting the market in ways that defeat the objective. Exempting or going easier on a class of vehicle may switch part of the market in that direction and thereby increase emissions of CO₂ and/or noxious exhaust. This risk is mentioned within the Consultation Paper, but its avoidance is missing from the guiding principles.

2. The scheme needs to encourage all practical methods of reducing emissions, including the use of lightweight materials.

Q. "Are there any design assumptions that you think will put at risk the implementation of a good FES for Australia?"

A category only needs to be completely exempted while no suitable LZEV exists on the world market. If the only options in some category are expensive or somehow limited in application, a very modest FES can be set. An importer may even have to sell a vehicle or two at a small loss initially, but it will help create the market.

This would help avoid the counterproductive market distortion mentioned above.

The categories that enjoy total or partial exemption need to be reviewed frequently to keep pace with technological developments.

Likewise, “*protecting the continued sale of vehicles Australians love*” should not be taken as implying protecting market share of, e.g., SUVs.

Q. “*Are the exclusions for military, law enforcement, emergency services, agricultural equipment and motorcycles the right ones?*”

The justifications for these exclusions are not entirely evident. They need to be stated to permit a reasoned response.

“*What principles should we consider when setting the targets?*”

That the world has much wasted time to catch up, Australia more than most. It is too late for the gently, gently approach.

“*What should Australia’s CO₂ FES target be?*”

“*How quickly should emissions reduce over what timeframe?*”

“*Should the Australian FES start slow with a strong finish, start strong, or be a straight line or take a different approach?*”

A difficulty with the slow start model is that in the early years the target may be met merely by importing slightly more efficient ICE cars commonly available overseas, and perhaps soon to be in excess of the targets in those jurisdictions. That will delay reducing the total emissions here later.

With regard to Global Warming, cuts now are worth more than cuts later.

The trajectory should be somewhere below a straight line drawn from where we are now to zero in 2035.

Q. “*How many years ahead should the Government set emissions targets, and with what review mechanism to set limits for the following period?*”

“*How should the Government address the risks of the standard being found to be too weak or too strong while it is operating?*”

A balance between flexibility and predictability can be had by setting a specific near-term target and a range for the following period. We suggest five years for the former and ten for the latter. The range for ten years hence could be, say, 30g/km to 40g/km below the five year target.

Q. “*Should an Australian FES adopt a mass-based or footprint-based limit curve?*”

Mass based, but on payload. See below.

Q. "If Australia adopts a mass-based limit curve, should it be based on mass in running order, kerb mass, or another measure?"

Basing permitted emissions on the unladen weight completely fails to reward the use of lightweight materials. The objective should be to reduce **emissions intensity**, i.e. emissions *per unit of useful work done*. Hence, the permitted emissions should be based on payload.

If a vehicle of mass M carrying a payload of P , including all occupants, has unladen emissions E (e.g. in gCO_2/km) then the best guess at its laden emissions is $\frac{E}{M}(M + P)$. Per unit of payload, that becomes $\frac{E}{M} \left(\frac{M+P}{P} \right)$.

For example, consider a 1000kg passenger vehicle rated at $120\text{gCO}_2/\text{km}$ unladen. With three occupants at 100kg each, including luggage, its emissions intensity is $(120/1000) \times ((1000+300)/300) = 0.52 \text{gCO}_2/\text{km}\cdot\text{kg}$. Contrast this with the scheme proposed in the Consultation Paper using kerb mass, which would estimate $0.12 \text{gCO}_2/\text{km}\cdot\text{kg}$.

Some questions that arise:

- *How does use of emissions intensity translate into rules for suppliers?*
Suppose that with the Consultation Paper's unladen weight parameter the target for the 1000kg vehicle discussed above at some point in time is $100\text{gCO}_2/\text{km}$. That corresponds to an emissions intensity of $0.433 \text{gCO}_2/\text{km}\cdot\text{kg}$. The imported vehicle exceeded that by $0.087 \text{gCO}_2/\text{km}\cdot\text{kg}$. At an average payload of 300kg, that is an exceedance of $26 \text{gCO}_2/\text{km}$, instead of $20 \text{gCO}_2/\text{km}$.
Now consider another vehicle that is 20% lighter yet with the same carrying capacity. All else being equal, its unladen emissions would be 20% less, $96 \text{gCO}_2/\text{km}$. But under simple unladen weight proportionality, the threshold drops by 20% too, giving an exceedance of $16 \text{gCO}_2/\text{km}$.
With the emissions intensity approach, the threshold is unchanged, while the value for the vehicle falls to $0.04 \text{gCO}_2/\text{km}$, making it compliant.
- *What payload should be assumed?*
Typical payloads, as fractions of rated maximum payloads, vary according to vehicle category. A two-seater might average 1.2 occupants, while a five seater only two. A supermarket home delivery vehicle is not going to average more than 40% of maximum payload since it averages at most 50% on the outward trip and returns empty. Specialised transporters, such as mining trucks and petrol tankers, top out at 50% since they usually return empty over the same distance.
- *What about the fuel tank?*
The fuel burden cannot be considered part of the useful work. If we take average contents as 60% of capacity then the mass of that needs to be added. If that 60% mass is F then the intensity is $\frac{E}{M} \left(\frac{M+P+F}{P} \right)$.
- *What about trailers?*
Both mass and payload of trailers should be incorporated in proportion to the average fraction of total distance travelled with such attached.
- *Other special cases*

For recreational vehicles, caravan trailers and mobile homes, it is not clear how to identify the useful payload, nor how to rate that usefulness.

Q. *“Should Australia consider a variant of the New Zealand approach to address incentives for very light and very heavy vehicles? If so, noting that new vehicles that weigh under 1,200 kg are rare, where should the weight thresholds be set?”*

Q. *“Should an Australian FES adopt two emissions targets for different classes of vehicles?”*

Q. *“Is there a way to manage the risk that adopting two targets erodes the effectiveness of an Australian FES by creating an incentive to shift vehicle sales to the higher emission LCV category?”*

It may be possible to find compromise payload percentages that make it unnecessary to discriminate vehicle classes in most cases. E.g.:

- A formula that converts number of seats to average mass of occupants
- An average fraction of other main vehicle maximum payload
- An average likelihood of a trailer attachment
- An average fraction of maximum trailer payload, when a trailer is used. (The maximum trailer payload would be the Gross Combined Mass (GCM) minus the Gross Vehicle Mass (GVM) quoted for the vehicle.)

Summing these average payloads produces the average total payload for the vehicle.

If the same formulae apply reasonably well across vehicle classes then there is no risk of category leakage.

“Climate impacts are linked to cumulative GHG concentrations rather than emissions in a particular year.”

It's not that simple. In ten years' time, a tonne of GHGs that enters the atmosphere now will have been warming the planet for ten years. If the emission is delayed a year, it will only have warmed it for nine years. Action now beats action later.

...

“Suppliers that do not meet their target can carry a debit forward with a shorter expiry period than for surplus credit.”

Clearly debits should not just expire. Presumably the intent here is that debits can only be deferred for so long, but the mechanism needs to be specified. An entity must not be allowed to remain in debt year after year, partly because of the insolvency risk.

Given the need for early emissions reduction, debits should accumulate interest. We suggest 8% p.a.

Q. *“To what extent should the Australian FES allow credit banking, transferring and/or pooling?”*

We have no concerns with regard to pooling.

Q. *“Should credits expire? In what timeframe?”*

Not expire suddenly, but shrink at, say, 8% p.a.

A potential problem is that credits will typically be in proportion to sales volume. A declining sales volume would effectively inflate the credits.

Q. "Should an Australian FES include multiplier credits for LZEVs?"

This does not seem to be a good idea. Counting one EV as two sales allows the supplier to double the number of over target ICE vehicle sales without penalty.

Q. "When do you think a FES should start?"

It should start as soon as practically possible. The longer the start is delayed, the greater the risk that suppliers will dump high-emitting stock into the Australian market in the interim. The pattern of car purchase may also anticipate its start. Could it create a spike in ICE purchases or a delay in EV purchases?

Q. "Should the Government provide incentives for the supply of LZEVs ahead of a FES commencing?"

It would be hard to establish additionality.

Q. "What should the penalties per gram be? Would penalties of AUD\$100 per gram provide a good balance between objectives? What is the case for higher penalties?"

Translating, the quoted US penalties equate to about AUD115 per g/km of exceedance. With the EU at almost AUD200 per g/km, a figure of AUD150 would seem reasonable for Australia. Information on experience in those jurisdictions would be helpful.

Q. "What, if any, concessional arrangements should be offered to low volume manufacturers and why?"

No such concessions should be made. Niche suppliers may need to enter pooling arrangements, likely increasing sales price.