POST 2020 VEHICLE CO$_2$ EMISSIONS POLICY

- Accounting for lifecycle emissions to avoid burden shifting

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THE TAILPIPE APPROACH

Vehicle Production ➔ Fuel Production ➔ Vehicle Use (Fuel Combustion) ➔ Vehicle End of Life

Current Regulations
Power demand and powertrain efficiency

Fuels & electrification

Aerodynamic drag and rolling resistance

External factors – user behaviour, traffic management ...etc.

Vehicle mass: lightweighting is an important part of tailpipe emissions reduction, but it is a complex topic, and has trade offs with other life cycle stages...
1990 EU Baseline emissions

40% expected emission reduction by 2030

Overall reduction requirement under the Paris Agreement

Contribution from the Road Transport sector

Production and End of Life

Best Case

Intermediate Case

Worst Case

Actual emissions

A HOLE IN THE TAILPIPE APPROACH
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Best Case

Intermediate Case

Worst Case

Production and End of Life

COST

USE
THE SIGNIFICANCE OF PRODUCTION EMISSIONS INCREASES ACROSS ALL POWERTRAINS

Estimate of how the balance of CO$_2$e emissions associated with individual lifecycle stages might vary for different technologies in the future.

(PE International/LowCVP, Life Cycle CO$_2$e Assessment of Low Carbon Cars 2020-2030, 2013, p.5)
“To achieve the right results it is important to evaluate and address the CO₂ efficiency of a vehicle in a holistic way, integrating lifecycle analyses [...] [to] also include the embedded emissions created during vehicle production, including the materials used and their disposal, with links to the circular economy.”
OEMs ALREADY USE LCA

Life Cycle Assessment (LCA)

Mazda adopts LCA, a method for calculating and evaluating the environmental influence of products across its entire life cycle of vehicles through the purchasing of materials, manufacturing, use of products, recycling and final disposal. In order to actively reduce environmental impacts, Mazda has confirmed the benefits of its clean-energy vehicles and newly introduced vehicles with current model internal combustion engines. In the LCA of the CF3 modelled in FY 2012, the CF3 underwent a review by a third-party auditing organization (Environmental Management Association for Industry) and is in conformity with the international standards (ISO 14040, ISO 14044) certification. The CF3 modelled in the FY 2012, the CF3 underwent a review by a third-party auditing organization (Environmental Management Association for Industry) and is in conformity with the international standards (ISO 14040, ISO 14044) certification.

Mazda intends to steadily expand the implementation of LCA to new vehicles and confirm their environmental benefits.

REDUCING OUR ENVIRONMENTAL IMPACT

Our most significant environmental impact comes from our products. The good news is that this is also where we can make the most significant improvements.

This is why we are investing heavily in research, engineering and manufacturing to deliver innovative solutions that will reduce the environmental impact of our vehicles throughout their entire life cycle.

Life cycle thinking

When we design a new vehicle, we have one aim: to make it even more sustainable than its predecessor. To achieve this we examine every aspect of a vehicle - from its design to the end of its life - to identify ways we can reduce its overall environmental impact, while increasing the vehicle’s performance and capability. We call this the Life Cycle Assessment (LCA).

It’s an approach that’s leading to a new generation of efficient vehicles. For example, the latest Range Rover features a 3.0 litre V6 engine, which, coupled with our lightweight aluminum technology, delivers the same performance as the outgoing V8 model.
GROWING SUPPORT FOR LCA IN POLICY

• Already used in existing EU policy to support the Renewable Energy Directive and Circular Economy Action Plan

• Several stakeholders are openly supporting the use of LCA in the automotive sector:

- EUROFER
- TRANSPORT & ENVIRONMENT
- FuelsEurope
- industriAll
- EFOA
- TRANSPORT STYRELSEN
LCA DEPLOYMENT FOR FUTURE REGULATION IN THE AUTOMOTIVE INDUSTRY

commissioned by WorldAutoSteel

Objectives:
• Develop and propose deployment methodologies
• Development of initial policy options
• Feedback from stakeholders (incl. OEMs and policy)
• Details of voluntary policy options
• Illustrative examples for implementation options

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Examples for the 4 selected policy options

- Theoretical examples and examples from practice

**Mandatory**

- **Performance**
  - **Direct**

- **Process**
  - **Direct**
  - **Indirect**

**Voluntary**

- **Performance**
  - **Direct**

**EU policy: biofuel limits in RED**

- Full LC based limit values

**EU policy: prep studies in EuP/ErP**

- Mandatory, systematic backoffice use of LCA to define non-LCA requirements

**EU policy: (dismantling/recycling concept in ELV-directive)**

- Mandatory to have an EPD or other form of full LCA report

**EU policy: (EU-Ecolabel, PEF)**

- Voluntary full LC information, e.g. option to include EPD requirements in GPP
Voluntary LC based policy/credit options

LCT

Credit Options

LCA

Innovations in...
Production

Credits...

...for improvements in the production phase

Consideration of...

CO₂ emissions

...for low GHG emissions in the production phase

...for ISO conform LCA studies and continuous improvement

...based on life cycle share of the use phase

...based on life cycle GHG emissions

CO₂ emissions & other impacts

...for reducing other environmental impacts
Global stakeholder dialogue

- Two global rounds of stakeholder consultations to present policy options to various stakeholders in the EU, the US, China and Japan including OEMs, policy makers, academia, and other organizations.
Key findings from stakeholder dialogue

No clear single preference of the policy options was identified......but some trends based on the feedback of the stakeholders:

- All stakeholders showed high interest in the policy options and agreed to continue dialogue with us!
- Academia → support the idea to use LCA in automotive legislation
- OEMs → support LCA and prefer voluntary policy options
- Policy makers → support LC thinking, are interested in learning more about the various policy options and prefer voluntary policy options
- Trend amongst OEMs and other stakeholders: voluntary policy option
- Voluntary options are especially favored in combination with credit schemes
LCA based credits can complement the current tailpipe legislation

Based on the feedback obtained from the stakeholders, focus was laid on the preferred voluntary policy options combined with credit systems to decrease LC CO\textsubscript{2} emissions

- This appears as a first promising solution for implementing LCA in legislation.
  - Credit systems are already used in automotive CO\textsubscript{2} legislation (e.g. US: Zero Emission Vehicle (ZEV) regulation, EU: Eco-innovation credits for reducing CO\textsubscript{2} emissions not accounted for in the test cycle, e.g. LED).
  - Adopting a LC perspective regarding CO\textsubscript{2} emissions contributes to an overall reduction of CO\textsubscript{2} emissions \(\rightarrow\) it follows the same goal as the “Eco-innovations”.

- As a complement to the current tailpipe legislation, credits would help to improve its efficiency and effectiveness and support and reward efforts on achieving real net CO\textsubscript{2} emission reductions.
  - Robust methodology
  - Conservative approach
  - Technology neutral
Intended effect of smartly defined life cycle credits

boundary of intended environmental and economic effects

policy incentives

fleet before tailpipe legislation  fleet today tailpipe legislation  fleet tomorrow tailpipe legislation
Intended effect of smartly defined life cycle credits

boundary of intended environmental and economic effects

policy incentives

life cycle optimized tailpipe legislation

credits

fleet before tailpipe legislation
fleet today tailpipe legislation
fleet tomorrow tailpipe legislation
BENEFITS

- Comprehensive assessment of CO\textsubscript{2} emissions
- Provides link to the circular economy
- Incentivises greening of the supply chain and improves information flow
- Reduces cost of legislative compliance
- Ensures EU manufacturing industry remains competitive in global trade
Policy request:

‘Post 2020 regulations need to recognise the increasing importance of embedded emissions by incorporating incentives for life cycle emissions accounting.’
THANK YOU FOR YOUR ATTENTION!

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