GEMEINSAM FÜR EIN
GUTES LEBEN

IG Metall's **demands**

with regard to European regulation of CO_2 levels for cars for the period after 2020

"The upcoming establishment of new CO_2 levels for cars in Europe must take into account secure jobs, efficient climate protection and economic interests.

IG Metall does not see any inherent contradiction here – on the contrary.

25 % of European expenditure on research and development is accounted for by the automotive industry. This makes Europe's automotive industry no. 1 in the world in this category. This innovative capability and dynamism is the engine for employment and jobs in the sector and a guarantee for sustainable technologies. The task is to maintain it and expand it. This is the demand being forwarded by IG Metall and its 2.3 million members regarding the new limits to be set for CO_2 levels in Europe."

Detlef Wetzel
President of IG Metall

Table of contents

Key positions and demands

IG Metall support an ambitious climate policy on the part of the EU. All sectors bear responsibility for the attainment of climate goals: the energy and petroleum sector as well as industry, services, transportation, households and agriculture.

With 2.2 million direct and 10.7 million indirect jobs, the automotive sector is one of the core areas of European industry. The engine of employment in the sector is its tremendous innovative power. Maintaining and accelerating this innovative power must also be an objective for European climate policy.

Innovation safeguards jobs. This connection also needs to be taken into account in any new regulation of CO_2 limits for the automobile sector in Europe. This is a key demand of IG Metall and its 2.3 million members with regard to European and German policy.

Innovative potential can be tapped through different technologies. IG Metall is convinced that the right path is to leave it up to enterprises to decide which drive and efficiency technologies they will use to attain climate and emission goals.

In general, IG Metall is in favour of regulating emission limits for cars. Innovations to the conventional drive train reduced CO_2 levels from 172 grams per kilometre in 2000 to 127 grams at present on European average. With a limit of 95 grams set for 2020, Europe already has the strictest emission target in the world. In regulating the period after 2020, it must be taken into account that combustion engines have physical limits when it comes to limiting CO_2 output. In setting emission limits for the post-2020 period, the current annual reduction factors can therefore not simply be extrapolated in a linear fashion.

There are high savings potentials for CO_2 to be found in a well-functioning traffic control system, in effective incentives for consumers, in low-CO_2 fuels and a raw materials/recycling policy that is firmly placed on a sustainable footing. IG Metall is calling for EU policy-makers to review these tools for CO_2 reduction in terms of their effectiveness and to take them into account within the framework of an all-embracing integrated package.

IG Metall advocates the specification of ambitious targets in laying down the new goals. Ambitious targets should contribute to maintaining the pace of innovation, stimulate additional investments in research and development and hence generate positive effects in the area of employment policy. IG Metall takes a critical view of any one-sided change in the regulatory system, as there is a danger that investments that have already been made in efficient technologies will be devalued, slowing down the pace of innovation.

Excessively stringent limits for emission standards will lead to increased costs per vehicle, thus jeopardising jobs. IG Metall considers an impact assessment to be urgently necessary prior to the setting of new limits.

- Electric vehicles will play a crucial role in the regulatory period after 2020. Because it is not possible to predict how quickly e-vehicles will penetrate the market, there are great risks involved in setting targets already now. On top of this, the travel cycle that it will all be based on will probably be introduced in 2017. IG Metall therefore calls upon the EU Commission to refrain from setting limits until 2017 at the earliest.

- IG Metall views electromobility to be a possible means of significantly reducing emissions in the transportation area. Electromobility will only constitute a CO_2 saving alternative, however, if cars are operated with green electricity. By the same token, technology developments in various sectors have to dovetail. It is only through the resolute expansion of renewable energy sources that it will be possible to attain climate targets.

- IG Metall calls for effective incentives to promote electromobility within the regulatory framework. Electrical travel must contribute zero grams of CO_2 output in the calculation of the vehicle fleet average as it has to date. The automotive industry is not responsible for emissions from stationary electricity production, which is already regulated through the emissions trade.

- IG Metall is also aware that electromobility will trigger structural change, however, and would like to help shape this in order to avoid disruptions in the labour market in this sector of industry. This mission of shaping this change must also be tackled by the political sphere. Value-creation in connection with electromobility also needs to take place in Europe.

- IG Metall expects that in contrast to regulatory practice down to the present the establishment of new limits for the period after 2020 will take place in a process of discussion and dialogue. Trade unions and employers must be included in this debate at the European level. The quantitative and qualitative impact of new limits on industry and jobs needs to be taken into account. This has not been the case in previous procedures.

Preliminary note

The EU Commission has been regulating limits for CO_2 emissions for cars since 1999. The limits that are to enter into force beginning in 2020 stipulating 95 grams of CO_2 per kilometre for the vehicle fleet average were only laid down last year. The European CO_2 target is hence the most ambitious one in the world.

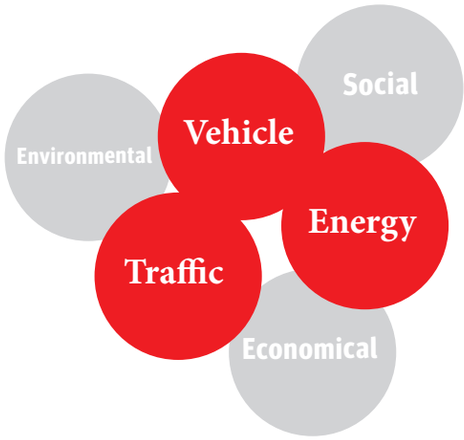
Diagram 1

Fleet targets: an international comparison

Fleet target for 2020 in grams of CO_2/km

Europe	USA	Japan	China
95	121	105	117

Source: VDA (Wissmann) 2013.



At present the agenda of the Commission calls for these targets for the period after 2020 to already be set in 2015. Setting these new targets will have a considerable impact on the automotive industry and its employees.

This position paper is the product of an intensive discussion within IG Metall involving works councils from the automotive and automotive supply industry. It presents the views as well as the demands of IG Metall regarding regulation of the CO_2 limits that are to be adopted for the period after 2020 for new registrations of cars. The upcoming establishment of new limits has been analysed in a systematic manner by addressing economic, environmental and social impact.

Jobs and innovative dynamics in the European automotive industry

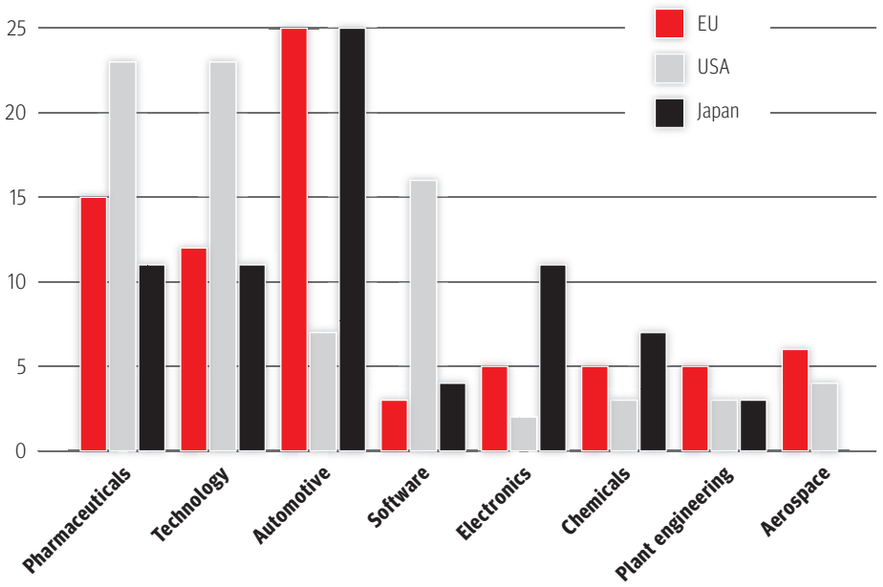
For IG Metall, the centre of attention is on the need to safeguard and secure jobs. With 2.2 million direct and 10.7 million indirect jobs, the automotive sector is one of the core areas of European industry (ACEA 2013).[1]

The European automotive industry is one of the most innovative and competitive in this global sector. This sector of industry is marked by high levels of ongoing expenditures on research and development (R&D), with more than EUR 32 billion in 2012, 9,500 patents, the headquarters of company-based R&D activities as well as a high number of employees working in R&D.[2] As a result of its macro-economic importance, the automotive industry in Europe has the nature of a system-critical sector.

Expenditures on research and development broken down by sectors

Diagram 2

R&D expenditures broken down by sectors
2011 in percentage terms



Source: ACEA Pocket Guide 2013, page 24.

1 ACEA (2013): Pocket Guide 2013 (status of information: 2012), page 29.

2 ACEA (2014): Factsheet Research and Innovation, page 1.

Bernd Osterloh
Central Works Council
Chairman at Volkswagen AG

"Special caution is warranted in the launch of electromobility and the legislation on the reduction of fleet CO_2, as profound structural change may have a massive impact on jobs, value-creation structures and chains as well as the distribution of labour between car-makers and automotive suppliers.

IG Metall intends to help shape this structural change and is aware of its responsibility for safeguarding jobs in Germany and Europe while supporting this emerging structural change. IG Metall believes that this includes an impact assessment that provides for the preservation of jobs."

There is an innovative and competitive lead of two to three years with the traditional combustion-engine drive train in particular. The European automotive industry moreover has a special position in the premium segment, from which a host of innovative solutions for the entire sector emanate. These involve safety, comfort and lightweight design aspects along with efficient and at the same time low-consumption combustion engines.

The emission targets of the EU Commission are especially focused on reducing the fuel consumption of combustion engines. For this reason it is crucial to the automotive industry that limits be set in such a manner as to allow the European automotive industry to continue to develop and implement innovations, to at least maintain its competitive edge and be able to safeguard jobs in this key industrial sector. For this to happen, it is necessary for the future levels of CO_2 reduction to be set in a prudent manner.

The highly complex structures and interrelationships involved in developing and producing automobiles have to be adequately taken into account in setting limits. Setting these "at the green table" runs the risk of setting limits too hastily and unrealistically. This is why IG Metall is calling for an impact assessment prior to the setting of these levels. It is imperative that there be a balance between climate protection on the one hand and targets that are economical for consumers and business enterprises on the other in order to avoid negative repercussions for employment.

Energy and climate

Producing energy from nuclear energy and from fossil fuels means that either a high-risk technology or existing finite and CO_2 intensive raw materials will be used for the production of electricity and heat.

In view of climate change, the growing production of energy from renewable energy sources stands at the focus of the debate. It is an important subaim of German and European energy policy. The share of renewable energy sources in total energy production is to be increased in order to become less dependent on fossil fuels.

In the energy transition in Germany, it has been decided to phase out and dismantle still-operating nuclear power plants by the beginning of the 2020s. Nuclear and over the long term coal-based energy is to be replaced by green or ecological electricity as well. Renewable energy sources already account for more than 28 % of electricity production at present, with plans to increase this figure to 40 to 45 % by 2025 and 55 to 60 % by 2035.

The energy transition resolved by the Federal German government has only been successfully implemented in part to date, however. The deadline set for the phase-out of nuclear energy production in Germany and the expansion of renewable energy sources is in part being counteracted by ongoing high levels of CO_2 emissions from electricity production based on fossil fuels (coal).

Wolfgang Schäfer-Klug
Central Works Council Chairman at Adam Opel AG

"Electromobility can only make an effective contribution to climate protection when it is supported by public investment in the infrastructure and the production of green electricity. Otherwise merely setting rigid CO_2 limits will be nothing more than window-dressing.

From a climate and jobs-policy perspective, EU limits therefore have to be set in a level-headed way and buttressed with additional measures."

Problems have cropped up with respect to the infrastructure, in the coordination of various levels in the expansion of power lines and the linkage of offshore wind power systems to the electricity grid. No sufficiently satisfactory solutions are perceivable here at the present point in time.

IG Metall expects the Federal German government to produce a binding roadmap for the future implementation of the energy transition. By the same token, technology development needs to dovetail in various sectors. Thus electromobility will only become a CO_2 saving alternative if cars are operated with green electricity. It is only the resolute expansion of renewable energies that will make it possible to actually attain climate objectives.

The climate and CO_2 reduction targets of the EU Commission

The reduction in CO_2 output is part and parcel of the international climate policy that the world agreed upon in the 1992 United Nations Framework Convention on Climate Change. The Intergovernmental Panel on Climate Change (IPCC) of the United Nations laid down in its report that greenhouse gases in the industrialised countries need to be reduced 80 % between 1990 and 2050 in order to limit global warning to +2°C. The EU and other industrialised countries agreed upon specific reduction targets for their greenhouse gas emissions by 2020 in the Kyoto Protocol.

For its part, the EU has set out climate targets and objectives for the reduction of CO_2 output on the whole as a community of states. The EU climate and energy package up until 2020 provides for a 20 % reduction in CO_2, a 20 % share of renewable energy sources in final energy consumption and a 20 % boost in energy efficiency.

Wolfgang Lemb
Member of the Executive Committee
IG Metall

"In view of the upcoming World Climate Summit in Paris at the end of 2015, the debate over an international climate accord has once again taken on salience. After years of de facto standstill in climate negotiations, there appears to be a greater readiness in many countries to become signatories to a global climate accord.

There are, however, no grounds for all too much optimism. Nevertheless, if we are to achieve something in climate policy, we need all actors – in Europe and throughout the world. IG Metall supports ambitious climate targets in the reduction of CO_2. We want to move forward with a sustainable industrial development that will hence be viable in the future."

The Energy and Climate Pact of the EU, which is to lay down the targets for 2030, is under discussion in the meantime. Proposals by the Commission were submitted in 2014 for the reduction of greenhouse gases by 40 % in comparison to 1990 and for the share of renewable energy sources to grow to 27 %. Energy efficiency is furthermore to increase 30 % by August 2014. A decision is to be made by the Council of Heads of State and Government at the summit scheduled for October 2014.

Car traffic can and must continue to make its own contribution to a reduction of greenhouse gases. Thus far the sector has achieved a disproportionate improvement compared to other forms transportation and their contributions.

An additional step has been taken with the move towards e-mobility. Electricity as actuator for cars must come from renewable energy sources if it is to contribute to the attainment of climate protection aims.

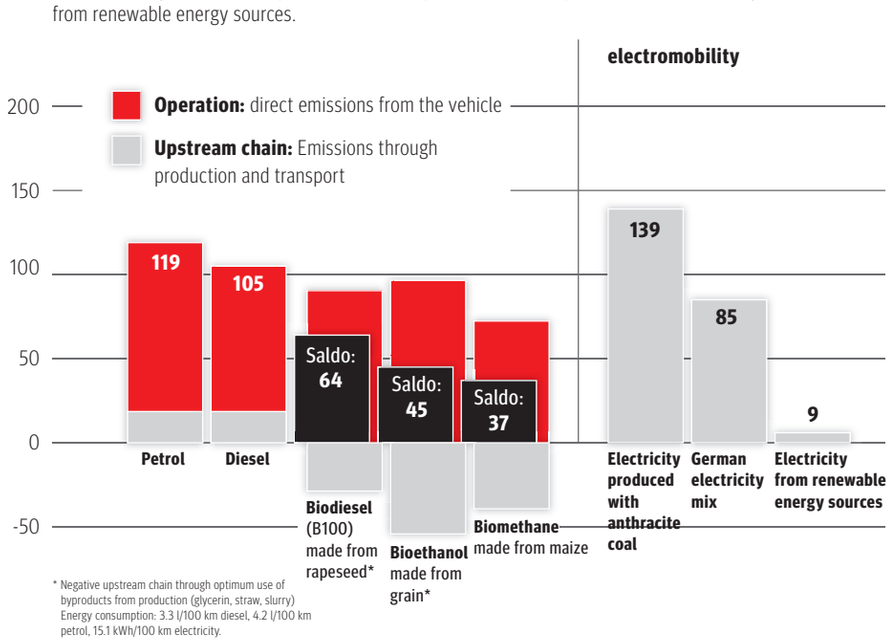
If the German electricity mix is applied, e-mobility does not make any real contribution to mitigating greenhouse gas emissions because even though no emissions occur through usage, the upstream part of the chain – production and transport of electricity – has a highly negative effect (cf. the diagram above).

IG Metall supports an ambitious climate policy by the EU and considers the further development of the international and European framework to be urgently necessary in the area of climate policy. Here the task, as it were, is to enlist the responsibility of all sectors – energy and petroleum, industry, services, transportation, households, agriculture – in the attainment of climate goals.

Diagram 3

Greenhouse gas emissions by various fuels and types of drive systems

Electromobility holds out the promise of climate protection in transportation if the electricity used comes from renewable energy sources.



* Negative upstream chain through optimum use of byproducts from production (glycerin, straw, slurry) Energy consumption: 3.3 l/100 km diesel, 4.2 l/100 km petrol, 15.1 kWh/100 km electricity.

Source: Hohenberger/Mühlenhoff 2014.

European CO_2 regulation of motor cars

From a climate perspective, IG Metall is generally speaking in favour of regulating emission limits for cars for the period after 2020.

Through innovation in the conventional drive train, which was primarily accountable for CO_2 legislation, CO_2 levels plummeted from 172 grams per kilometre in 2000 to 127 grams at present on European average.

At 95 grams for 2020, Europe has already set the strictest emissions target in the world. What goal is set for the period after 2020 depends above all on how the market launch of electromobility develops. If the e-vehicle segment attains a high volume, average fleet consumption will decline markedly. If the market launch continues to limp along as it has to date, it will only decline marginally.

In other words: the greater the market share of e-vehicles, the lower the pressure to reduce consumption for other vehicles. It is for this reason problematic when it comes to setting out limits now or in 2017 without knowing how the launch of e-vehicles will go. The closer we come to 2020, the better the market launch can be observed and the more accurately that forecasts can be made for the coming years.

IG Metall is basically in favour of regulating emission limits for cars. Limits will be heavily impacted by the share of electro-vehicles sold in the future. The market launch of electro-vehicles is difficult to forecast at present, however. IG Metall is calling upon the EU Commission wait to set limits for the period after 2020 until 2017 at the earliest. It is recommended that this process be broken down into several steps.

"The current development of market shares for e-vehicles remains significantly behind expectations – including as a result of deficient infrastructural investment by the public sector.

It also remains unclear with a view to the future how rapidly customers will accept this change in technology. In terms of fleet consumption, however, the share of e-vehicles is decisive. As a result of this uncertainty as well, a CO_2 limit for 2030 should not be laid down in the short term now."

Martin Hennig
Chairman of the Central Works Council Ford-Werke GmbH

E-mobility as a contribution to a secure supply of energy

A familiar problem with renewable energy sources is their volatility, as they are usually dependent on the weather. Electricity from renewable energy sources is fed into the energy grid in a fluctuating intensity that is focused on direct consumption and is built largely without any storage capacity. The German electricity grid is this almost completely inflexible and requires smart management to balance out fluctuating electricity production, steer demand for electricity and include storage capacity in the equation.

E-mobility could make a contribution to supply security here. Underlying this idea is the prospect of the battery capacities of e-vehicles offering a considerable volume of storage capacity. This volume could be used to compensate for fluctuating volumes of electricity from renewable sources fed into the grid.

Because the electricity grid is only configured in one direction at present, however (from the production of electricity to consumption), it has not been possible to integrate electro-vehicles to date. Creating another track in a (bi-directional) electricity network requires greater investment in the infrastructure (including software). The German Energy Agency estimates that EUR 52 billion would have to be spent on this by 2030.

An integration of vehicles moreover presupposes an accounting system, which first has to be developed and then implemented. Finally, the technical question of how frequent to constant charging and running down of vehicle batteries in electro-vehicles can take place can take place without detracting from the lifetime of the battery. This is where the foreseeable second life phase of these batteries comes into play, however: as soon as vehicle batteries can only be charged up to 80 % of their original capacity they are replaced – which means that the storage potential still remaining in the first battery could also then be made available for stationary energy storage.

IG Metall calls upon the Federal German Government to develop and launch smart grids, modern electricity grids and accounting systems within the framework of the energy transition and e-mobility.

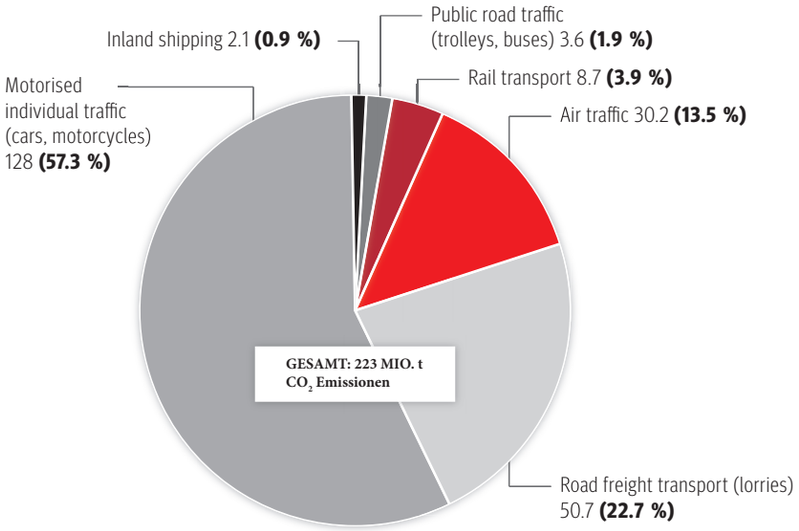
Transportation and mobility

Mobility is a fundamental right in today's industrialised societies. Even if there is a dense and well-functioning "local public urban transport" network in cities and especially large cities, it is largely lacking in rural areas. Poor connections, the need to travel at specific times and in part worksites located in hard-to-reach areas force people to use cars in order to travel to and from work.

The trend towards megacities that have 10 million or more inhabitants that can be witnessed throughout the world at present is especially pronounced in the newly industrialising countries. Approximately 60 % of the world's population will be living in cities in the foreseeable future. Already now we are familiar with gridlocked traffic, with its effects on emissions and climate. In the stop-and-go traffic of present-day megacities, motorised individual traffic is scarcely still possible.

Diagram 4

CO_2 emissions broken down by means of transport (millions of tonnes of CO_2 emissions 2010); status as of 11-2013



Source: Hohenberger/Mühlenhoff 2014.[3]

3 Hohenberger, Tilman / Jörg Mühlenhoff (2014): Renews Spezial, issue 71 / March 2014 – Hintergrundinformation der Agentur für Erneuerbare Energien; Energiewende im Verkehr, Potenziale für erneuerbare Mobilität, Berlin.

In view of the growing distance between places of living and places of work, changing worksites and the systematic need for cars, the volume of road traffic will continue to soar.

IFEU Heidelberg has estimated energy consumption for road traffic and direct emissions up until 2030 for the Federal German Environmental Agency. According to its study, CO_2 emissions in Germany will drop 11 % between 2011 and 2030. The significant growth in road freight transport will compensate for the decline in car traffic however, with the latter expected to drop 30 % over this period (IFEU 2012:66).[4]

In der EU total traffic volume rose 10.5 % from 2000 to 2010, while public transportation surged 19.2 % and car traffic went up by 10.3 %. Above all air traffic grew significantly by 25.9 % over the same period of time. In contrast to the means of transport cited, buses and ships registered a negative trend in kilometres travelled by persons per year.

The biggest share of emissions in Germany is accounted for by individual motorised traffic (57.3 %). It is for this reason not surprising that this type of traffic is at the focus when it comes to attaining climate goals. Nevertheless, other means of transport cannot be ignored in the effort to meet targets, as demonstrated by the surge in air traffic.

This situation is in stark contrast to freight traffic, whose volume has grown much faster than individual transportation in terms of distance travelled – not least due to the expansion of Europe towards the east, the shift in goods transport from rail to road (instead of the other way around, as is politically and environmentally desired) and also by virtue of an intensifying international division of labour in the manufacture of goods (logistical traffic, which rarely uses rail).

Along the lines of climate protection, the political objective must be to avoid as much traffic as possible in order to attain as beneficial a distribution as possible between motorised individual transportation, public and rail transport – a "modal split", as it were – and to shift traffic to low-emissions means of transportation. Strategies for improving the modal split are already being trialled at present in the form of car-sharing fleets, which are being established and offered in various large cities. It is above all carmakers that are creating these possibilities and beginning to develop themselves from carmakers into integrated mobility service providers.

In sum, the task is to revamp the existing transportation system towards an integrated mobility strategy – this is long overdue. At the same time it must be ensured that mobility remains affordable for the population.

IG Metall is calling for balanced participation by all transportation sectors in the reduction of CO_2 and hence the attainment of targets set by policy-makers.

4 IFEU Institut für Energie- und Umweltforschung Heidelberg GmbH (2012) TREMOD Version 5.3, final report for the 2013 Emission Report for the Federal German Environmental Agency, Heidelberg.

Road traffic and the impact on climate goals

A wave of privatisation and liberalisation since the beginning of the 1990s went hand in hand with a decline in public transportation. Government investment was scaled down, especially with respect to the maintenance and expansion of infrastructure. On the other hand, some advances were made at the same time: the introduction of environmental zones in cities, the expansion of high-speed rail networks, the launch of traffic telematics systems to avoid traffic jams and hence reduce CO_2 output and a shift to a CO_2 based car tax, etc., all the way to "job ticket passes" for local mass transportation.[5]

In spite of these measures, it must be said with respect to the transportation infrastructure that there is an enormous backlog in investment, particularly with respect to bridges urgently in need of overhaul and repair. K. Rietzler has described the situation as an "ongoing deterioration of the infrastructure".[6]

Stop-and-go traffic, detours as a result of decrepit bridges or crumbling infrastructure cause emissions to rise. The current condition of our infrastructure is counterproductive.

Annual investment needed for the road infrastructure in Germany is estimated at EUR 6.1 billion up until 2030 if the focus is on stretching expenditures and at EUR 7.6 billion if the infrastructure-overhaul schedule is accelerated (by 2020) (FES 2012:23)[7].

Infrastructure will in the future also include investment in electricity charging stations in public areas to support e-mobility. So far energy producers in Germany have hesitated to build charging stations in larger numbers, as they do not perceive it as profitable. Investment in building these stations cannot be recovered by selling electricity through them.

A major contribution to a reduction in emissions could be made by minimising traffic jams in cities and on motorways or avoiding them altogether. Traffic telematics systems aim to do just that. By integrating digital information technology in motor vehicles, traffic planners expect additional information to help avoid traffic jams.

Infrastructural investment at the government level offers a tremendous potential to avoid production of CO_2. A major step in the direction of reducing CO_2 emissions in Europe can be taken by ensuring adequate transportation routes and properly functioning telematics systems. The expansion of the battery-charging infrastructure is also of key importance here.

IG Metall is therefore demanding that policymakers at all levels make these investments so urgently required as rapidly and as continuously as possible.

5 cf. Ziegler, Astrid (2011): Mobilität und Arbeit – Anforderungen an den Industriestandort Deutschland, Frankfurt /M.

6 Rietzler, Katja (2014): Anhaltender Verfall der Infrastruktur - die Lösung muss bei den Kommunen ansetzen, IMK Report Nr. 94, Düsseldorf.

7 FES [Friedrich-Ebert-Stiftung] (2012): Abschätzung des Investitionsbedarfs für die Verkehrsinfrastruktur in Deutschland; study carried out by INTRAPLAN Consult GmbH for the Friedrich-Ebert-Stiftung.

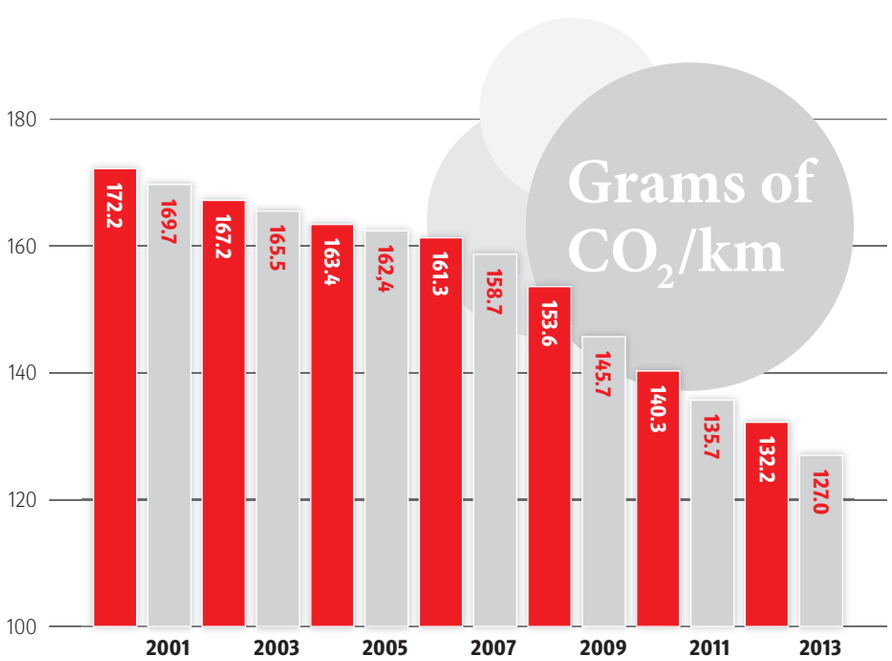
Car production and structural change

CO_2 reduction and electro-mobility

The European automotive industry invests considerable sums in optimising combustion engines to meet respectively stipulated average limits on fleet consumption by manufactured cars while satisfying the rising demand of customers for economical motor vehicles in times of soaring fuel pries and CO_2 based taxes. In doing so, it has further expanded its global leadership in innovation with conventional drive trains. Through these efforts it was successful in reducing CO_2 levels from 172.2 to 127.0 grams of CO_2 per kilometre on average for all European manufacturers in the period from 2000 to 2013 (-24.2 %).[8]

Diagram 5

CO_2 Reduction in newly registered cars in the EU from 2000 until 2013



Source: according to VDA (V. Diemer) 2014 (date from the European Energy Agency [EEA]).

8 Source: VDA, V. Diemer (2014): CO_2 Regulierung PKW, Präsentation Frankfurt / Main (transparent 7).

Uwe Hück
Chairman of the Central Works Council
Dr. Ing. h.c. F. Porsche AG

"We only have this one earth, not several of them. We should all be aware of that. There is no contradiction between a reduction of CO_2 and secure jobs. They both go together.

Investment in new technologies and drive technologies are necessary in order to become more efficient. Whoever fails to invest now will be left on the margins in the future.

It is not belt-tightening that is needed, but rather investment. With its high profit margin, Porsche needs to lead the way."

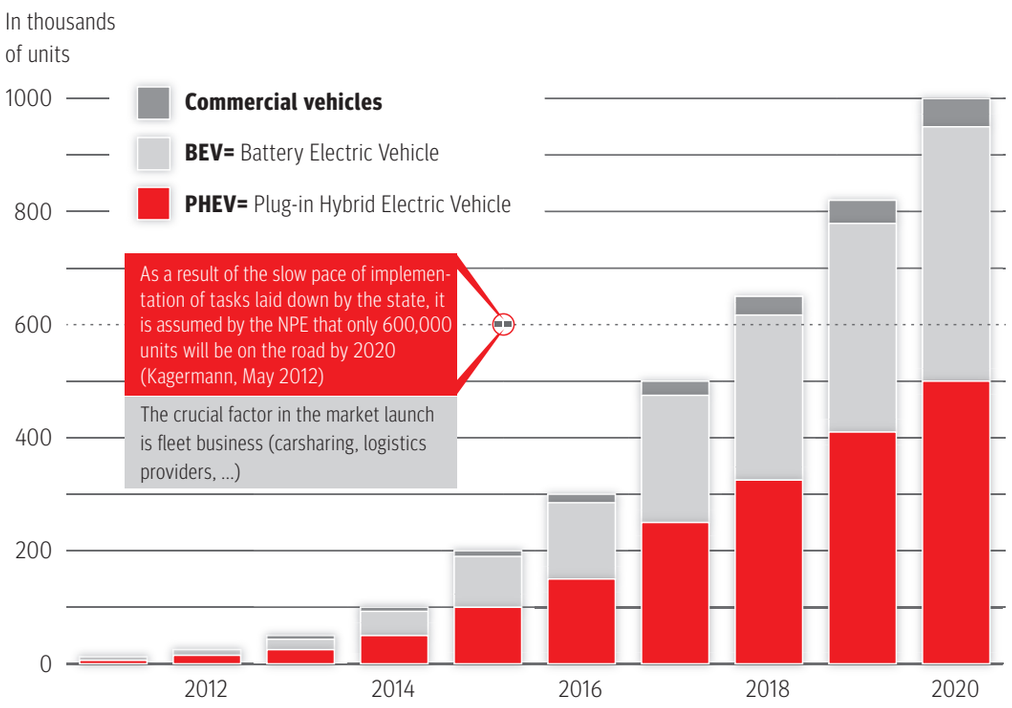
An emissions target of 95 gram CO_2/km as fleet average has been set for 2020. Already at present it is clear that this goal can only be attained for large-dimensioned combustion engines with considerable investment in efficient technologies and through electrification of conventional drives.

An electrification of the combustion engine drive train was spelled out as a political objective by the Federal German Government in the National Electromobility Plan in 2009. The National Platform for Electromobility (NPE) was set up in 2010. It has been supporting the Federal Government with broad-based involvement of societal actors in the aim of putting one million e-vehicles[9] on the road by 2020. This is intended to help Germany become a leading market and leading provider of electromobility.

9 E-vehicles are considered to include purely electrically-driven vehicles (battery-electrical vehicles = BEV), range extender vehicles = REEX) and plug-in hybrids (PHEV). What they all have in common is that they can travel at least 30 km using solely electrical power (status of the discussion).

Diagram 6

Market launch of e-vehicles according to types up until 2020 (cumulative)



Source: NPE 2012.

As of the middle of 2014, forecasts and scenarios of the scale and at what point in time that the market for e-vehicles will take off diverge considerably. These accounted for 0.2 % of total motor vehicles in Germany as of 1 January 2014[10].

In view of the lack of state action, NPE assumes that the quantitative target set by the Federal Government will be considerably fallen short of by 2020, which means that the "mass market" will not be achieved in 2020.

Doubts exist, however, as to whether e-mobility will gain acceptance, as climate and energy-savings potential and CO_2 reduction targets can only be attained through e-mobility. The combustion engine will continue to be a pillar of the drive train until 2030, but electrified for the most part and in different forms.

IG Metall is calling for incentives to be created for electromobility within the framework of regulation, including in the future. It is above all important for electric travel to contribute a weight of zero grams of CO_2 output in the calculation of the fleet average.

10 Source: KBA

Structural change

While market prospects of e-vehicles are uncertain in terms of the numbers and the time frame for diffusion, all the players in the automotive industry are aware that e-mobility will be accompanied by profound structural change and have a massive impact on jobs, on value-creation structures and chains as well as the division of labour between carmakers and automotive suppliers.

In the middle of first decade after 2000 the focus of scholarly studies was on the effects of electrification of motor vehicles, the use of new materials (lightweight design), the optimisation of combustion engines at workstations and the training of employees. In view of the innumerable factors involved, any forecast of impact in quantitative terms must remain a rough estimate.

With respect to the qualitative impact, it has been pointed out, however, that the ongoing pace of innovation, massive expenditures on R&D, new products and components not only stabilise employment – these also help expand the number of jobs (Jürgens / Meißner 2005).[11]

Michael Brecht,
Chairman of the Central Works Council Daimler AG

"Employees in the automotive industry are relying on technological and societal change in the direction of sustainable mobility opening up future opportunities for them.

They must be able to believe and trust in the assurance that structural change associated with all this will not put them at risk. That is why it is crucial for environmental, economic and social issues to be put in a healthy balance along these lines."

11 Jürgens, Ulrich / Heinz-Rudolf Meißner (2005): Arbeiten am Auto der Zukunft – Produktinnovationen und Perspektiven der Beschäftigten, Berlin.

IG Metall generally speaking assumes that electromobility has the potential to generate industrial jobs. The precondition for this is that conventional drives also play an essential role in individual mobility over the medium term (plug-in hybrid) and sales targets for electrocars in 2020 are attained. Another precondition is for production and hence value creation for the new technologies and services to be located in Germany.

The future of the automotive industry has been examined by the Bundestag Committee for the Impact of Technology from a systematic perspective against the background of the changing global automotive market and the launch of new mobility concepts.[12] The study describes two scenarios for global growth in sales figures from 70 million at present to 125 million in 2030. In a third scenario (mobility concepts), an increase to 105 million is posited. On the whole, the report concludes that German carmakers will also continue to manufacture premium vehicles[13] in Germany in the future as well.

Taking value-creation aspects into account, it is pointed out that approximately one-fourth of value creation is accounted for by the conventional drive train. The German automotive industry has a significant technological lead here. With alternative drives the portion of the combustion engine in the overall value-creation is reduced (hybrid vehicles) or even completely eliminated (BEV). One part of the value-creation that is eliminated can be compensated for through the development and production of alternative drive components.

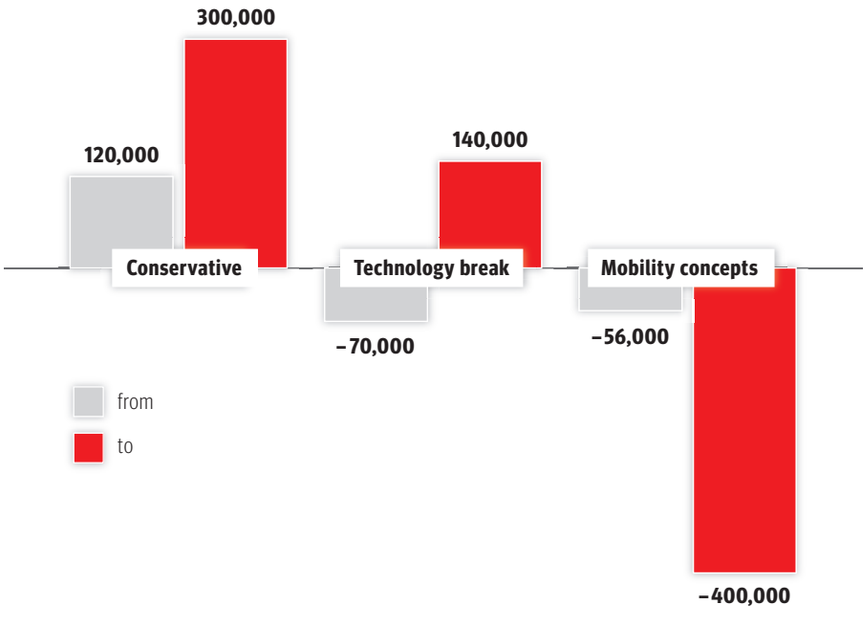
12 Deutscher Bundestag (2013): Bericht des Ausschusses für Bildung, Forschung und Technikfolgenabschätzung (18th Committee) in accordance with § 56a of the Business Rules – Technology Impact Assessment (TA) – Zukunft der Automobilindustrie, printed matter 17/13672 and Konzepte der Elektromobilität und deren Bedeutung für Wirtschaf, Gesellschaft und Umwelt, printed matter 17/13625, Berlin cf. also Schade, Wolfgang / Christoph Zanker (2012): Zukunft der Automobilindustrie – Innovationsreport, Office for the Assessment of Technology Impact at the German Bundestag, working report no. 152, Berlin.

13 German carmakers dominate the market for premium vehicles, accounting for approximately 80 %. The premium segment is marked by high tech and exclusive equipage and is not only limited to the premium segment. Small cars such as the BMW Mini and Audi A1 are also to be found in the premium segment, for example. This is where the biggest profit margins can be attained. This market segment will grow along a more stable trajectory than other market segments.

The bandwidth of effects on jobs illustrates the tremendous uncertainty of forecasts of this nature based on a host of assumption and influential factors:

Diagram 7

Bandwidth of employment effects: three scenarios and the number of jobs



Source: Author's own projection on the basis of BT TAB 2013.

Manfred Schoch
Central Works Council Chairman at BMW AG

"Climate targets can only be achieved with secure jobs in Europe, as it is only through the purchasing power of employees that innovations can pave the way to customers.

Climate policy of the future can only safeguard jobs if a comprehensive review of the transportation sector is conducted before any targets are set.

Instituting more stringen limits at the present point in time without having reviewed all the tools and instruments available for CO_2 reduction in the transportation sector in terms of their effectiveness and comprised together in an integrated total package may jeopardise jobs on a massive scale."

IG Metall views electromobility to be a way to significantly curtail emissions in the transportation area. It also sees the structural change in industry that will be triggered by electromobility, however, and will help shape this change in order to avoid disruptions in the labour market. IG Metall is also aware of the need for policy-makers to help shape this change.

IG Metall is by the same token focusing on the number as well as the quality of jobs. It will make sure that decent labour and pay conditions continue to prevail at companies in the European car-making industry.

The driver of innovation has been and still remains the premium vehicle segment, in which European carmakers account for 80 to 85 % of the market segment. The majority of vehicles are produced in European plants, securing employment there. Innovations trickle down over time from the premium segment to the volume segment, thereby becoming standard and serial equipment after several years (for example: ABS, ESP, electronic steering, navigation systems).

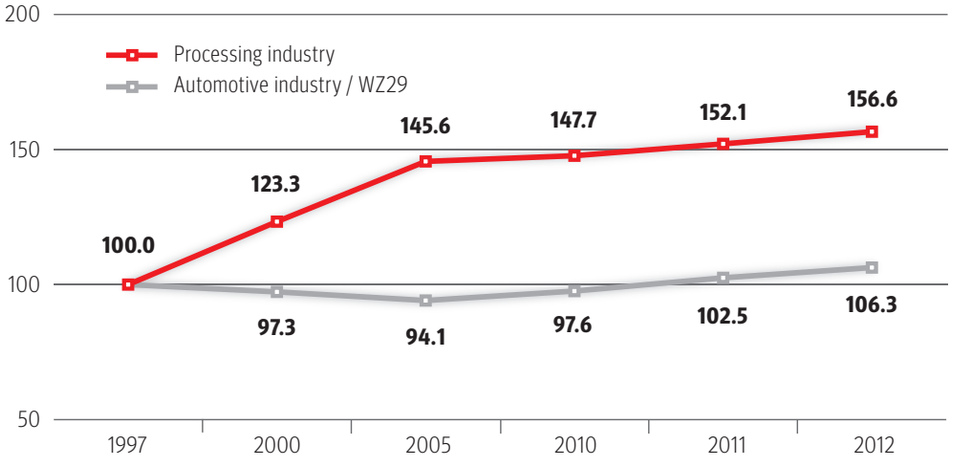
The automotive industry is the main pillar of European and German industry with respect to research and development. Almost one-third of all R&D employees work in this sector and 25 % of industrial R&D expenditures are accounted for by this branch. If one in addition takes into account that these R&D activities have a spill-over effect above and beyond this branch, e.g. into plant engineering or the electronics industry, the key role of the automotive industry in the innovation system becomes evident.

IG Metall expects policy-makers to make sure when they establish limits that

- the pace of innovation and the innovative capability of the automotive industry can be maintained and expanded,
- the high level of employment is preserved and
- it is left up to enterprises to decide which efficient technologies, which lightweight design concepts and which emission-reduction technologies they develop and use to attain the targets that are set.

Diagram 8

R&D employment trend in the German automotive industry (1997 to 2012) on full-time equivalents (1997=100)



Source: Stifterverband, FuE-Info, various years, most recently Feb. 2014.

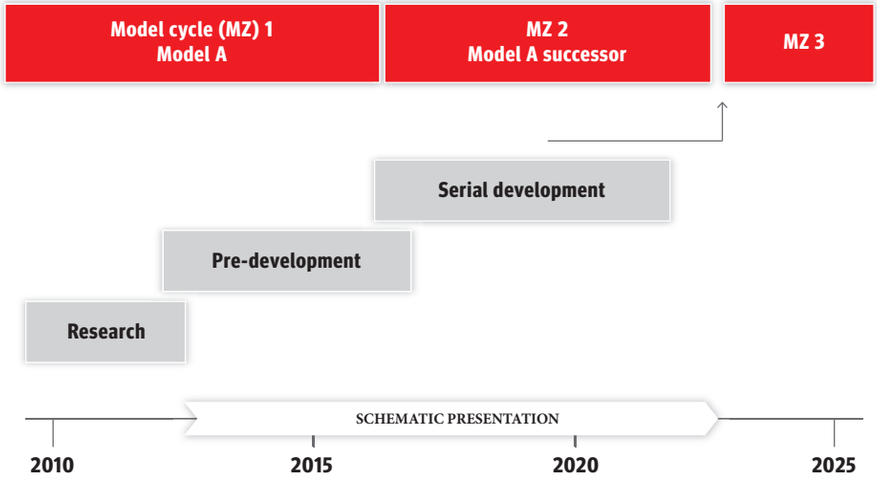
Motor vehicle development and technological limits in the reduction of CO_2 emissions

The innovative dynamics described in the foregoing have for some time now been focused on achieving the CO_2 targets laid down by the EU through optimisation of combustion engines, lightweight design and increasingly through the electrification of the drive train.

German industry has invested EUR 17 billion in e-mobility over the last few years – the majority of which has come from the automotive industry. Expenditures on R&E are first invested by manufacturers as well as suppliers in research. Research results flow into hand-picked pre-development projects, while the remaining results are "placed on the shelf". Pre-development produces prototypes that are oriented toward future mass production, including tools and processes all the way to quality assurance systems and testing processes within the framework of series development. This development process above all safeguards the jobs of highly trained engineers in various disciplines.

Diagram 9

R&D and model cycles – the path of innovation to new motor vehicles



Source: author's own graphics.

Peter Mosch
Central Works Council Chairman
AUDI AG

"We support the ambitious emission targets of the EU with our highly trained team and 'lead through technology' put in practice.

CO_2 limits should not be set beyond the year 2020 before 2017.

In order to preclude risks, we should await the launch of a worldwide harmonised driving cycle and the market development of electronic motor vehicles."

Estimates by the automotive industry to date assume that the target of 95 grams of CO_2 in 2020 (corresponding to fuel usage of 3.8 litres of petrol per 100 km) can be attained through the measures introduced. More far-reaching reductions (after 2020) are being discussed in a restrained manner. The crucial factors are investment security, clear roadmaps and no simple linear extrapolations of existing annual mitigation factors.

Enterprises in the automotive industry are calling for planning security for their investments in efficiency technologies, electric drives and in R&D. IG Metall supports this demand, as innovation cannot be generated and implemented overnight in highly complex automotive production. It usually requires, rather, a period of ten to fifteen years.

An additional uncertainty from the perspective of carmakers is the change in the underlying driving cycle that EU legislation will use in determining emission limits. The driving cycle establishes under what conditions a motor vehicle is operated in determining energy or fuel consumption. The results of the driving cycle are part of the manufacturer's information for registration and distribution. The currently used "New European Driving Cycle" (NEDC) will probably be replaced in 2017 by the "Worldwide harmonized Light vehicles Test Cycle" (WLTC).[14] Regulation of CO_2 targets after 2020 will have to suffice for the new driving cycle. It is at present unclear how the cycle used to date and the new cycle will look relative to one another. This makes it significantly more difficult to establish a specific CO_2 limit at the present point in time.

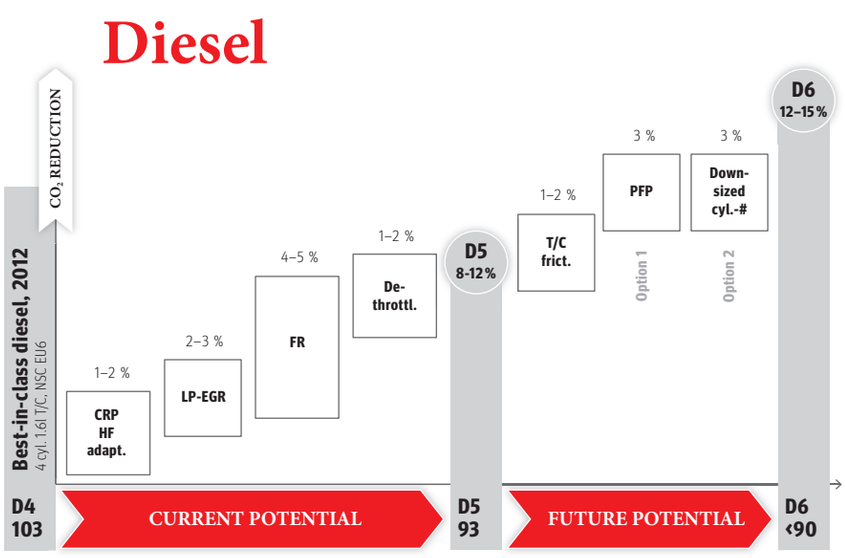
Carmakers are restrained when it comes to quantifying physical limits for future increases in efficiency and CO_2 reduction. Manufacturers of efficiency technologies communicate possibilities to them at international symposiums and conferences. The development trajectory of existing solutions was presented, for example, at the Viennese Motor Vehicle Symposium in 2013:[15]

14 The launch for the WLTC / WLTP is expected between 2017 and 2025.

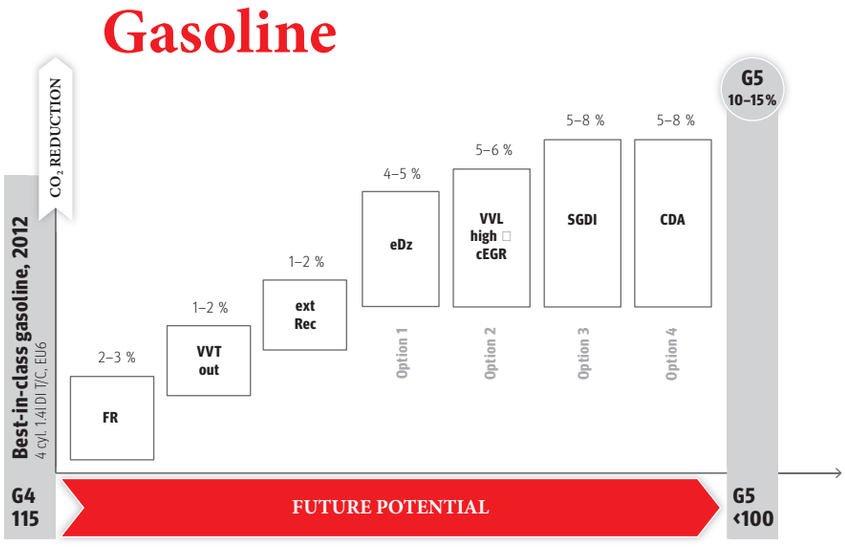
15 Denner, Volkmar (2013): Zukunft gestalten – Innovationen für effiziente Mobilität, 34. International Viennese Motor Vehicle Symposium 2013.

Diagram 10

CO_2 reduction potential of diesel and petrol engines in the compact class



CRP/HF= common rail pressure / hydraulic flow | **LP-EGR=** low-pressure EGR system
FR= friction reduction | De-Throttl. = de-throttling engine | **PFP=** low-peak firing pressure
T/C= turbocharger | **NSC**= NOx storage catalyst



VVT= variable valve timing | **SGDI=** lean burn | **FR=** friction reduction engine | **eDZ=** extreme downsizing
VVL= variable valve lift | **high □=** high compression | **cEGR=** cooled exhaust gas recirculation
CDA= cylinder deactivation | **ext Rec=** extended recuperation | **DI=** direct injection

Source: Denner (2013:5,8).

- in the sub-compact and compact class, internal optimisation of petrol and diesel engines will lead to the target area; initial hybridisation[16] is already available for a further reduction;
- by way of comparison, large motor vehicles will not be able to reach the target solely through optimising the combustion engine. In addition to weight reduction/lightweight design, aerodynamics and the reduction of driving resistance, greater electrification will be absolutely essential (e.g. plug-in hybrid). This will, however, ultimately lead to greater costs.

New engine technology offers the prospects of another reduction in CO_2 output if, for example, variable valve control, direct injection, turbocharging and an increase in compression are used. It is already clear at present as well, however, that there are physical limits on the combustion engine with regard to the reduction of CO_2 output. That is why the currently existing annual mitigation factor cannot simply be extrapolated in a linear fashion.

In addition to internal engine solutions, additional innovations will also be coming down the pipeline to reduce CO_2 output – so-called "eco-innovations".

Eco-innovations

Diagram 11

- **Aerodynamics**
- **Lightweight design**
- **Sailing functions** (maximum rolling)

- **Heat management**
- **Heat pumps**
- **Pre-conditioning of drive and interior**

- **Vehicle networking to avoid traffic jams**
- **Driver assistance systems**
- **Low-consumption route planning**
- **LED lighting systems**

Source: author's own compilation.

16 Such as, for instance, the Boost Recuperation System.

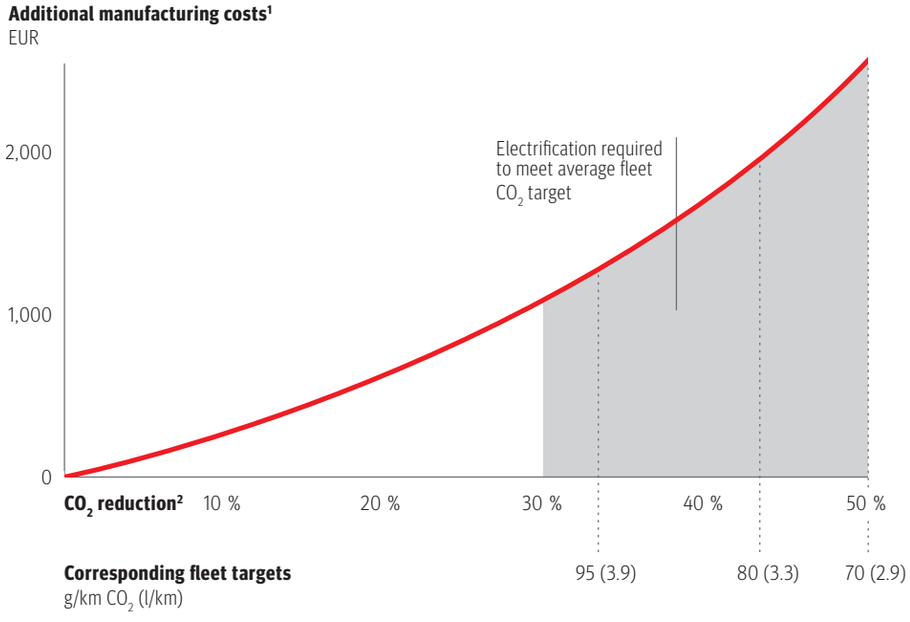
All these measures, be it in the engine or in other areas, are not to be obtained for nothing – and the willingness of customers and car buyers is limited when it comes to spending money on additional functions that do not either enhance the comfort or the safety of the vehicle. Solely reducing fuel consumption has scarcely any impact on willingness to pay more.[17]

It can also be seen that manufacturing costs will rise disproportionately with increasing reduction in CO_2 output. Efficiency technologies, hybrid variants or purely electric drives must be used in order to be able to even reach lower limits.

Diagram 12

Additional production costs

Tougher emissions regulations will encourage OEMs to invest in e-mobility



1 Anticipated for 2020, average for gasoline and diesel internal combustion engines
2 Relative to 2010 baseline

Source: McKinsey 2013:12 — McKinsey (2013): The road to 2020 and beyond: What's driving the global automotive industry.

17 Porsche assumes, for example, that the additional costs of CO_2 reduction per vehicle of EUR 2,000 will not be paid by customers, and will instead have to be borne by boosting productivity by 6 % per year (Handelsblatt, 7 August 2014:14 f.).

"Classic combustion engines definitely offer more potential for CO_2 reduction, which should definitely be taken advantage of.

Appropriate innovations and investments are stimulated through rational, but demanding limit targets in temporal and physical terms. This will offer enterprises planning security and can safeguard jobs through innovation leadership."

Alfred Löckle
Central Works Council Chairman
Robert Bosch GmbH

It cannot be estimated at present what solutions, innovations or even other inventions can be expected in the next few years. It can be expected, however, that in view of high R&D expenditures in the automotive industry both by carmakers and automotive suppliers that a host of innovations will be developed in the second half of this decade.

Work is already being performed on "autonomous driving" concepts at present. The industry is in the process of preparing for the networking of vehicles in the direction of communicating with one another and with the traffic infrastructure and is already offering the aforementioned efficiency technologies. On top of this, ultra-light steels, carbon and aluminium are being used to reduce vehicle weight.

All of the innovations named or touched on here as examples are above all driven by CO_2 regulation. Even though in the past there was a vehement discussion over levels, these have triggered an effort to search and find solutions.

IG Metall views critically any one-sided change in the regulatory system, as there is a danger that investments already being made in efficiency technologies now will be devalued and the pace of innovation will cool. With regard to regulation after 2020, it must be taken into account that the combustion engine faces physical limits on the reduction of CO_2 output. In determining emission limits for the post-2020 period, the annual mitigation factor applying at present cannot simply be extrapolated into the future in a linear fashion.

Too great a degree of tension created by emission standards may lead to considerable additional costs per vehicle. As a result, jobs could be jeopardised.

IG Metall believes that an impact assessment is urgently necessary prior to setting new limits.

Sustainability and recycling

Saving resources in the production process (along the lines of a sustainable mode of production[18]) has been a pivotal topic in the automotive industry for many years. An all-embracing look at environmental sustainability takes the entire value-creation process into account, i.e. upstream production levels as well. Subsumed under sustainability aspects is the so-called Product Environmental Footprint of products, used to quantify savings in the use of resources.

Carmakers and large suppliers have reacted to this with different levels of transparent and comparable environmental reports, describing their efforts and progress in the direction of this resource efficiency.

The Center of Automotive Management (2014) has assessed environmental reports by global carmakers for the years 2012-2013 and listed their average success in saving resources in production per motor vehicle (see the following table).

Diagram 13

Improvement in resource consumption per motor vehicle on average among global carmakers (2012 in comparison to 2008)

Resource	Reduction	Value for 2012
CO_2 output	-17.0 %	0.71 t per vehicle
Total energy needs	-13.9 %	2.6 MWh per vehicle
Fresh water	-12.0 %	4.5 m^3 per vehicle
Solvents	-16.8 %	3.1 kg per vehicle

Source: CAM press release from 28 January 2014.

18 "Sustainable mode of production" is a notion that goes back to the sustainability strategy of the World Commission on Environment and Development of the United Nations from 1987 (cf. the Brundtland report).
The Council for Sustainable Development was established by the Federal German Government in 2001. A strategy for sustainable development was presented in 2002 entitled "Prospects for Germany". Respective sustainability reports have been issued in the meantime (most recently in 2012) and statistical indicator reports published (2014), although these do not provide any information on specific sectors.

The successes documented here indicate that sustainable production has arrived in the automotive industry and more and more attention is being devoted to making car production "greener".

With the introduction of ISO 14001 ("Environmental management systems – Requirements with guidance for use"), the VDA has focused on responsibility for the supply chain, thus including the Global Environmental Footprint in its assessment (VDA 2013).

The reduction in CO_2 output over the period 2008 to 2012 (cf. the table) indicates that much has been achieved with regard to resource efficiency, energy efficiency and easing the pressure on natural resources (water) in car production over the last few years. The fact that the industry will continue along this trajectory in order to take advantage of still-unused savings potential becomes clear looking at the objective that Volkswagen has set: all its sites throughout the world are to reduce the environmental impact per vehicle produced by 25 % by 2018 compared to 2010.[19]

Taking the example of the BMW I3, the project manager cites this electric vehicle as an example that the production process has been designed for resource efficiency in order to significantly reduce water and energy consumption in comparison to conventional production (-50 % for water, -30 % for energy). At the same time, reuse of the so-called life modules made out of carbon need to be used and possible uses in other product areas explored (Kranz 2014)[20].

At the other end of the process or value-added chain is the recycling of old vehicles. The return, environmentally sound disposal and production designed so as to allow recycling were stipulated by law for the automotive industry in Germany in the 1996 Recycling and Waste Management Act (Kreislaufwirtschafts- und Abfallgesetz). This was followed in 1998 by the End-of-Life Vehicles Regulation (Altautoverordnung), which laid down the establishment of an infrastructure of certified accounting and shredding plants, the establishment of material cycles and the reduction in waste that has to be disposed of. In 2000 an EU Directive (End of Life Vehicle 2000/53/EC) laid down the return of motor vehicles and material prohibitions against lead compounds and lead alloys, chromium VI and mercury (Jürgens / Meißner 2002)[21].

A new EU Directive ("End of Life Vehicles Directive [ELV]) requires a recycling quota of 85 % for all components in automobiles beginning on 1 January 2015. It has been stipulated in addition that 95 % of all construction material be captured in the recycling process and properly disposed of (ICM AG, press release from 21 March 2014).

Requirements relating to sustainable production project design all the way to recycling must be respected at present and in connection with the electrification of drive trains and a growing number of lightweight design concepts. This is also to be one aspect of future CO_2 regulation in Europe.

19 VW (2014): Think blue. Factory, Nachhaltigkeit rauf. Umweltbelastung runter. So funktioniert es, Wolfsburg.

20 Kranz, U. (2014): Lecture at the annual ACOD Congress 2014, Leipzig.

21 Jürgens, Ulrich / Heinz-Rudolf Meißner (2002): Innovation und Beschäftigung im Fahrzeugbau, Berlin (transparency presentation with the final report).

Final remarks

"Demanding limits stimulate innovations that safeguard jobs within the framework of structural change.

It must at the same time be taken into account, however,that very exacting emission standards can lead to considerable additional costs per vehicle and thus distortions in competition. This can potentially jeopardise jobs.

IG Metall's calls upon the European Commission as follows: In contrast to regulatory practice to date, the setting of new limits for the period after 2020 must take place within the framework of a dialogue and debate. This must involve trade unions and employers at the European level."

Jörg Hofmann
Vice President of IG Metall

IG Metall will be forwarding its demands regarding regulation of European emission limits for cars for the period after 2020 in the public debate on the basis of this position paper in the next few months. Together with works councils from the German car-making and automotive supplier industry, it will be seeking a dialogue with political representatives at the national and European levels.

We are also planning on carrying on the debate within European trade unions on the basis of this position paper. The aim is to coordinate a common position.

Ultimately, from the perspective of IG Metall actors should be aware when setting new limits what quantitative and qualitative impact these new limits may have on employment and jobs. A dialogue is necessary as well as an impact assessment. From a trade union perspective, too, little attention has been devoted to this in previous procedures.

Annex

Directory of diagrams

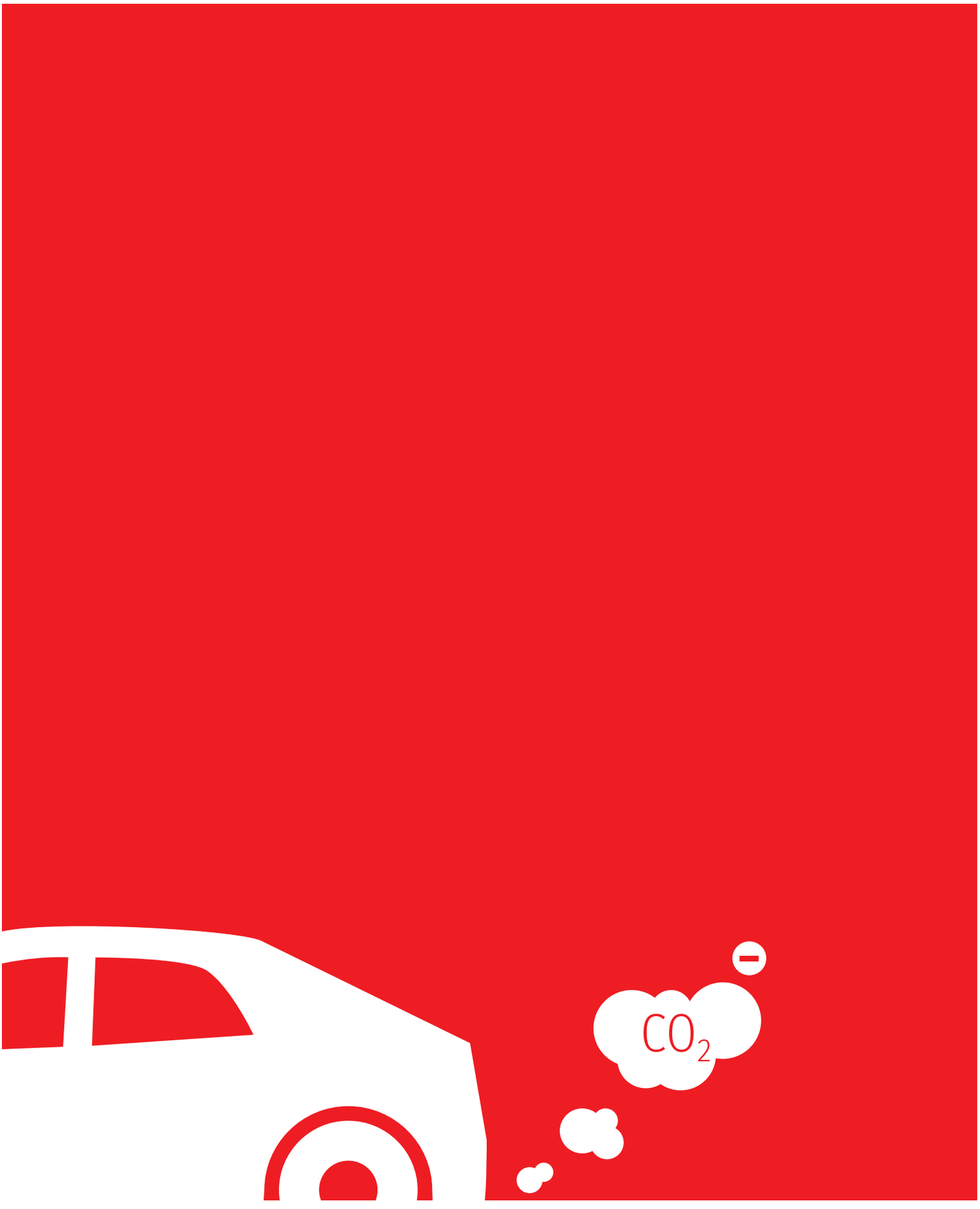
Diagram

published by:
IG Metall Vorstand
Wilhelm-Leuschner-Straße 79
60329 Frankfurt

in charge:
Detlef Wetzel
1. Vorsitzender IG Metall

Working Group for Regulation for Cars at IG Metall
Thomas Balzer, Christian Brunkhorst, Peter Cammerer,
Babette Fröhlich, Albrecht Gramling, Hans Lawitzke,
Heinz-Rudolf Meißner, Thomas Metz, Dirk Rosenau-Tornow,
Lorenz Thoma, Angelika Thomas, Bernhard van Dyken

Issued in October 2014


CO_2