Members of European Council
Representatives of EU countries

Subject: Information about calculus of CO₂ emissions and clear failure to meet the target for reducing CO₂ emissions; request for elaboration of a balanced regulation

Dear Ladies and Gentlemen,

the signees of this letter thank you for your ambitious efforts to reduce the CO₂ emissions in the near and distant future. The intergovernmental panel of climate change (IPCC) has emphasized in its 2018 report, that the complete mankind is allowed to emit only 420 GtCO₂ in order to limit the global warming by 1.5°C. A quick, effective reduction of CO₂ emissions is therefore important.

Signees and supporters of this letter already have informed important representatives of different institutions in Europe in the last months and years and emphasized major concerns about the suggested legislation to reduce CO₂ emissions, especially in the sector of mobility.

The supporters of this letter typically had or have been working as lectures and instructors at universities all over the world as experts in the field of energy conversion, thermodynamics, energy transfer or energy balancing. Most of these supporters are experts in the course of studies of mechanical engineering, process engineering or chemistry engineering, which are the studies with the deepest and most intensive focus on major kinds of energy balancing.

The signees in combination with hundreds of supporters of this letter again want to repeat their criticism, that a serious miscalculation (averaging bias) in the analyses of CO₂ emissions caused by all electrical consumers is obviously influencing political initiatives. Above all, the misdrection leads to significantly increased CO₂ emissions. For basic explanation, please take our example (see Table 1, page 2). We therefore repeat our clear criticism that the elaboration which has been taken as a basis for the preparation of a CO₂-roadmap is without physical basis and thus wrong! The real CO₂ emissions of all electric consumers (including BEV) are significantly higher than those of the inadequate average-value based approach, leading to the significant averaging bias.

Even future technology potentials like the increasing possibility of electrical energy storage in surplus times do not change the fundamental fact that the approach of calculation is unsuitable (Table 2 on page 3). Electrical storage capacities improve the situation but don’t solve the problem. Nor does a modification of the composition of energy carriers (coal subsidized by gas) for power plants change the fundamental error.

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1 For questions regarding status of IASTEC please contact: landry.cochard@scinnov.eu
2 i.e. Open letter to the European Parliament and the European Council on the risk of failure to meet long-term climate protection goals in the transport sector due to insufficient legal regulations, April 19th 2022 as well as June 17th, 2021 by T. Willner, A. Günther and supporters
Please see criticized Figure ES5 of the mentioned publication (page 9):at the end of this letter
4 BEV: battery electrical vehicles
Daughter Eve has a total financial need of 6000€/a to finance her studies. Eve supports through own jobs: 40% (2400 €/a) or in another case even 80% (4800 €/a) can be contributed. The parents support Eve and have to pay for the remaining costs: 60% (3600 €/a) or even only 20% (1200 €/a) in the second case. The total financial need is now increased by 100 € due to additional costs (software, cloud, mobile phone, ...) ending up with total cost of 6000 €/a + 100 €/a = 6100 €/a. Eve’s own contribution remains the same! The parents again must fill the gap: 3700 €/a (3600 €/a + 100 €/a) or 1300 €/a (1200 €/a + 100 €/a). The additional costs of 100 €/a must be completely borne by the parents, in both cases, no matter how high Eve’s own contribution is.

However, the analysis, which is the basis for the EU decision, figuratively calculates additional costs for the parents of only: 100 €/a * 60% = 60 €/a or 100 €/a * 20% = 20 €/a A total of 100 €/a must be paid additionally by the parents in both cases. A significant and severe balancing error (factor 5) exists!

Table 1: examples of averaging bias as a consequence of average-value based analysis leading to a result of 20 €/a instead of 100 €/a (left column), respectively 2 TWh/a instead of 10 TWh/a (right column)

Please read our key messages of page 4, which summarize consequences coming out of the criticized analysis and inform about important aspects of complementary road maps.

We expressly emphasize that we recommend the intensive further development of BEV technology for numerous applications. At the same time, we urgently need technology freedom for the best possible CO₂ reduction including a much more ambitious increase of non-fossil based reFuels as blending components of fuel.

The crucial question is whether the EU wants to ban thermodynamic energy conversion based on chemical energy storage for individual mobility (IC ban) or whether it wants to save CO₂ as quickly and as much as possible in both the short as well as the long term! Optimal CO₂ reduction is definitely not achieved by a simple IC ban!

Therefore we kindly request you not to vote for a simple IC ban but to develop a balanced regulation which additionally considers all aspects of mobility with relevance to society, economy and above all environment. In other regions of the world reFuels are mandatory for a sustainable energy system.

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5 Photovoltaics and Wind etc. is called “green energy”
Eve’s work for a scrap metal company enables additional income. Every 6th day of her work she is allowed to take home as much scrap metal as she can carry and get the proceeds for free. Eve buys the best backpack and carries home as much scrap metal as possible. Eve already earns 4800 €/a and additional proceeds of scrap metal enable (1220 €/a)
\[4800 \text{ €/a} + 1220 \text{ €/a} = 6020 \text{ €/a}\]
Eve can even pay her study! 0% money of parents is required
The cost increase by 100 €/a from 6000 €/a to 6100 €/a. Again, the parents must support Eve.
The parents must support 80 € out of 100 €, although 100% of the cost were covered by Eve before cost increase!
The averaging bias erroneously defines expenses of the parents of 0 €!

| Table 2: Enhanced example, considering the possibility of energy storage, of averaging bias leading to a result of 0 €/a instead of 80 €/a (left column), respectively 0 TWh/a instead of 8 TWh/a (right column) |

Of course, we repeat our willingness to support you in the process of accomplishing the best possible regulation in order to quickly and efficiently reduce CO₂ emissions.

Yours sincerely

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The following key messages summarize the content of our letter.

A. The EU ambitions to quickly reduce CO₂ emissions are highly appreciated.

B. However, the calculation of CO₂ emissions of an electrical demand according to the highly criticized standard approach is useless and misleading⁶. This criticized standard calculation (i.e. 20 kWh/100 km multiplied by an average CO₂ footprint of 360 g CO₂/kWh⁷ resulting into 72 g CO₂/km) underestimated real CO₂ emissions of an electrical demand by far, as mostly fossil power plants (range between 500 to 1100 g CO₂/kWh) typically need to supply this demand in addition to the normal electricity. The CO₂ impact of electric consumers therefore is clearly higher than calculated (see Table 1, page 2)⁸.

C. Electrical energy storage possibilities improve the situation, but the analysis according to above explained B. remains wrong (see Table 2, page 3).

D. Before evaluating a technology ban, it is very important to determine the environmental impact reliably on the basis of a correct and systemic analysis.

E. A quick CO₂ reduction is only possible in combination with complementary alternatives to electro-mobility like low CO₂ reFuels (bioFuels, eFuels) also with respect to defossilisation of the existing fleet! An intelligent mix of technologies (BEV, refuels) will enable a best overall CO₂ reduction⁹.

F. A well-designed hybrid drivetrain in combination with reFuels-blends (i.e. R33, G40) enables a CO₂ reduction potential significantly below 100 g CO₂/km (~50% of today's benchmark). A hybrid technology strategy will be standard in the future in order to further reduce the CO₂-emissions. Also after the year 2040 we cannot afford to leave out any solution to reduce CO₂ emissions!

G. The large-scale production of reFuels will enable costs below 1 €/l and ensure a fair option especially for people with low income¹⁰.

H. Overall from the scientific point of view a renewable Fuel path (refuels) is sustainable and environmentally friendly.

I. In the case of a "BEV-only strategy", we are heading into a clear state of dependency, especially on materials and processes from China and other regions of the world.

J. Modern ICE¹¹ drivetrains (as of EU6 temp /final) can be assumed to be close to immissions neutral.

K. Many socially important transport solutions depend on ICEs i.e. civil protection, military, fire fighting vehicles, rescue and ambulance vehicles, tractors, harvesters, heavy duty construction and working machines, etc. These will become significantly more expensive if the upstream innovation performance of the automotive industry is lost.

L. Many OEMs (i.e. Audi, BMW, Honda, Geely, Mazda, Porsche, Renault, Skoda, Stellantis, Toyota, Renault, Volkswagen) did not sign the Cop26 Glasgow call for a ban of the ICE! The ICE knowledge would be lost in Europe and be transferred to other continents in case of an ICE-Ban in Europe.

M. Technology-open states such as China intensively follow the path of CO₂ neutral reFuels in conjunction with other technologies.

N. Freedom of technology remains an important pillar of our common good and future and must be ensured by a balanced and wise regulation.

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⁶ In essence, the criticism addresses the difference between average costs and marginal costs and every analysis with average costs underestimates the real environmental relevance of marginal costs (costs/taxes are comparable to CO₂ emissions).

⁷ The average CO₂ footprint of an electricity system is assumed to be 360 g CO₂/kWh in this example.

⁸ Every electrical consumer acts as an additional consumer, an old fridge in the basement as well as a new server/BEV/heat pump. Switching off each consumer would typically reduce the need of fossil based electrical energy.

⁹ The additional energy demand of eFuels in comparison to a BEV utilization is by far not as critical as claimed. Indeed 2-3 times more electrical energy is required in the case of eFuels, but on the other hand side favorable worldwide locations enable high efficiency of photovoltaics and wind (2-4 times higher than average European locations) and must be considered as well. Even more important, the energy storage and availability problem will be solved with eFuels.

¹⁰ Hydrogen treated vegetable oil (HVO) is well established and cost are well known. eFuel cost depend on the price of electric energy. Low energy cost in the range of 1 €Cent/kWh enables very low efuel cost below 1€/l.

¹¹ ICE: internal combustion engine, ICEs will basically build a Hybrid drivetrain in the future together with an electric motor.
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314. In addition, we would like to point out that a parallel initiative of the undersigned Prof. T. Willner with further 183 supporters from Academia (note: a couple of double nominations in comparison with above list exist), mainly from the field of process and chemical engineering as well as natural sciences, also emphasizes the necessity of a correct CO₂ analysis and considers a freedom of technology as crucial.
Attachment

Critiqued Figure ES5 of the mentioned publication (page 9):

Figure ES5: Comparison of Lower Medium Car lifecycle GWP impacts for conventional gasoline/diesel ICEVs and BEVs for different EU countries, Baseline scenario. Breakdown shown for new 2020 vehicles, and the total only for new 2030 vehicles.

Notes: Results shown for the lower medium car in the baseline scenario. Production = production of raw materials, manufacturing of components and vehicle assembly; WTT = fuel/electricity production cycle; TTW = impacts due to emissions from the vehicle during operational use; Maintenance = impacts from replacement parts and consumables; End-of-Life = impacts from collection, recycling, energy recovery and disposal of vehicles and batteries. Additional information on key input assumptions and derived intermediate data include the following: a lifetime activity of 220,000 km over 15 years. 2020 BEV battery at 58 kWh, with 330 km WLTP range (and with 64 kWh and 449 km WLTP electric range for 2030); a average lifetime EU28 fuel/electricity mix (age-dependant mileage weighted). No battery replacement is needed for BEVs.