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DOES THE CURRENT EU CLIMATE POLICY ENDANGER THE ECONOMIC FUTURE OF THE EU COUNTRIES DUE TO UNSETTLED CLIMATE SCIENCE?

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Abstract

Research Background: The "European Climate Law" aims at achieving net zero carbon dioxide emissions within the next 27 years. It is based on the findings of the IPCC and its climate outlook for the 21st century. However, there are serious doubts about IPCC computer models and concerns that measures to curb emissions are not balanced by the possible benefits.

Aim: We want to show the economic impact of climate legislation and bring new facts and aspects to the scientific debate that serve as justification. Furthermore, we find that climate science on global scale is not really settled and we designed a suitable experimental setup to clarify this important question

Methods: We reviewed relevant EU legislation, and performed lab and field measurements of infrared back radiation depending on varying CO2 concentrations compared to atmospheric CO2 concentration. To assess the potential economic impacts of current EU legislation, we surveyed with experts from different fields.

Findings & Value added: Our findings corroborate the repeatedly voiced doubts that increased CO2 will lead to dramatic climate effects. We see clear evidence for saturation of IR absorption at current CO2 concentrations in the atmosphere. A qualitative expert survey points at the potentially negative economic impact of present EU climate legislation.
Keywords: European Climate Law, IPCC, EU Green Deal, CO2 saturation, experiment, measurement, economic impact assessment,
JEL classification: O52, O39, K32, C90, Q20, Q54

1. Introduction

The EU considers climate change as an existential threat and wants to reduce net greenhouse gas emissions by at least 55% by 2030 and down to 0% by 2050 within the „EU Green Deal". Economic growth should be decoupled from the use of energy resources contrary to traditional thinking and practice. It therefore sees fighting climate change as one of the most important targets although Europe contributes less than 10% to the world population and CO2 emission. There is considerable dissent about the impact of growing CO2 levels on temperature increase and their implications on living conditions. While the IPCC and the EU are predicting strong and negative effects John Christy (Christy, 2017) has shown that all of the climate models fail the test to match the real-world observations by a significant margin. Moreover, clouds are also scientifically not fully understood and therefore a big question mark in global climate models (Wild, 2020).

With a relative low cost experimental setup we measured the IR back radiation from varying CO2 levels within a given N2 atmosphere. The results confirm previous findings about infrared CO2 saturation within the earth‘s atmosphere. Measurements were also performed studying the potential thermal forcing of additional CO2 against clear night skies. These results will be 1 Corresponding author: steiner@str2030.at discussed in more detail somewhere else and their interpretation should be seen as another contribution to the general discussion about correct climate measures to be taken. Human activities have a profound and often negative impact on the environment. The concept of planetary boundaries (Steffen, 2015) provides a general framework for the different aspects of environmental degradation, with biodiversity loss and the change of nitrogen cycles among the areas of greatest concern. Human activities influence the climate in a multitude of ways. Soil sealing causes the urban heat island effect, increasing temperatures significantly compared to surrounding, non-urban areas (Phelan, 2015). Changes in the chemical composition of the atmosphere by emitting CO2 and aerosols have an impact (Portner et al., 2022) as well as aircraftinduced clouds (Kärcher, 2018).

2. Methods

The main objectives of this paper are: On the one hand, to present reasonable doubts regarding the safety and reliability of the scientific basis as justification of the EU climate legislation and on the other hand, to show what massive impact this legislation would have on EU citizens and the EU economy.
Review of relevant EU Legislation and analysis of justification. We analyzed specific EU legislation relevant to the topic of this paper. Specifically, this analysis refers to REGULATION (EU) 2021/1119; REGULATION (EU) 2018/842, and Directive 2003/87/EC.

2.1 Own measurements and experiments

Due to the lack of specific measurements and experiments on the topic we made measurements ourselves. We describe our measurement setup in 3.1. First results for laboratory and field measurements are in 3.2 and 3.3. We will investigate two additional aspects here: Is there a saturation of back radiation due to increased greenhouse gas concentrations? Has this saturation limit already been reached at the current CO2 levels in the atmosphere?

2.2 Economic impact assessment by expert survey

Political and economic impacts for three different stakeholder groups were determined through expert interviews. Six experts have been interviewed, face to face and independent of each other. They are from several scientific fields. The arithmetic mean was calculated from these ratings.

The three different stakeholder groups are:

- EU citizens & Mittelstand
- EU member states &EU
- international corporations

Each of these six interviewed experts are out of different scientific fields: Ecology, physics, energy, entrepreneur, environmental engineer, data management, Ratings:

Green = positive for this stakeholder
Red = negative for this stakeholder
Black = neutral for this stakeholder
1 = Minimum impact, 9 = maximum impact

3. Results

3.1 Two different experimental setups

The focus was in measuring whether greenhouse gases (GHG) have indeed the potential to increase the temperature through thermal back-radiation as a function of their concentration. Two questions arise here. Is there actually a saturation limit on back-radiation due to increased GHG concentrations? Has this saturation limit already been reached at current CO2 levels in the atmosphere?

Figure 1 (next page) explains the setups for Lab and Outdoor Modes.
In Fig. 1a ("Lab Mode") a cooling compression device is placed below the so-called cooling plate. The measurement cylinder with a thin Polyethylene (PE) foil is hermetically sealed and thermally insulated by appropriate seals. On the opposite site the Calcium chloride (KCl) Window glass faces the laboratory ceiling. The IR detector is mounted in the center of the window and thermally stabilized. According to the Second Law of Thermodynamics, the warmer surroundings of the laboratory radiates towards the colder cooling plate and warms the variable GH gas concentrations. The back-radiation is then measured with the IR sensor from ThorlabsÒ.

In Fig. 1b the test cylinder is rotated by 180°, the cooling compressor is removed and replaced by the clear night sky.

The measurement cylinder is first filled with pure N2. After thermal equilibrium is reached, CO2 is added in 50ml steps. The CO2 concentration is measured with a fast and sensitive gas sensor. The IR sensor reacts instantaneously to changes in the gas composition (see 3.2. and 3.3.), as it reacts to the reflected power.

In the field test arrangement, the IR sensor takes the place of an astronomy-type terrestrial observer of space, „looking" through the troposphere into space. By gradually feeding additional CO2 into the measuring cylinder, it can be observed whether there is a measurable change (increase) in the reflected power. This experiment can also be done using other GH gases.

3.2 First results laboratory measurements

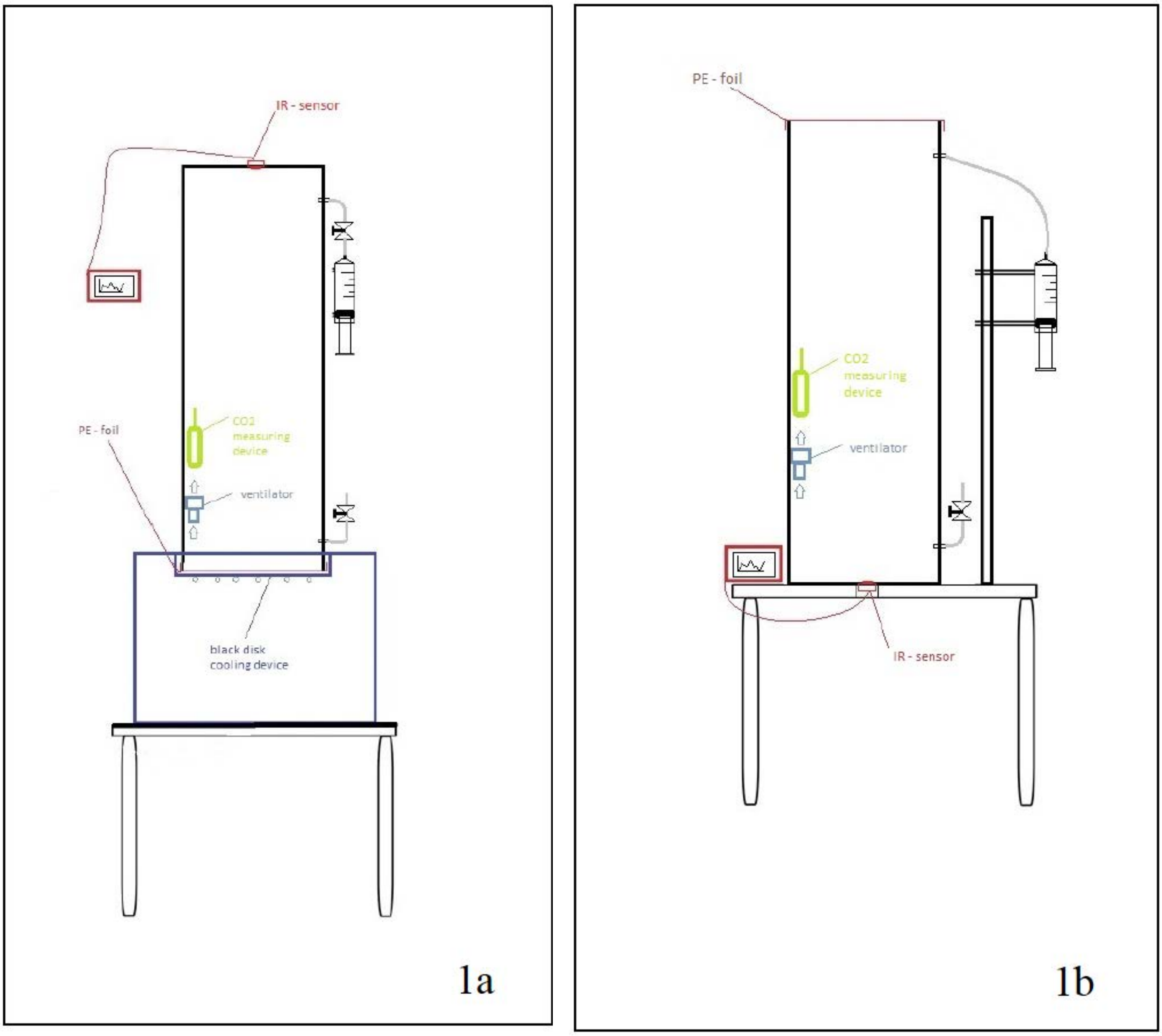

Figure 1. Experimental setup for (a) "Lab Mode" using a cooling compressor and (b) "Outdoor Mode"

Source: own drawings

After some small improvements to the measurement setup, we obtained reproducible results for various CO2 concentrations when measuring in the Lab-Mode. Fig.2 shows the averaged data for each 50ml CO2 adding for two different runs.

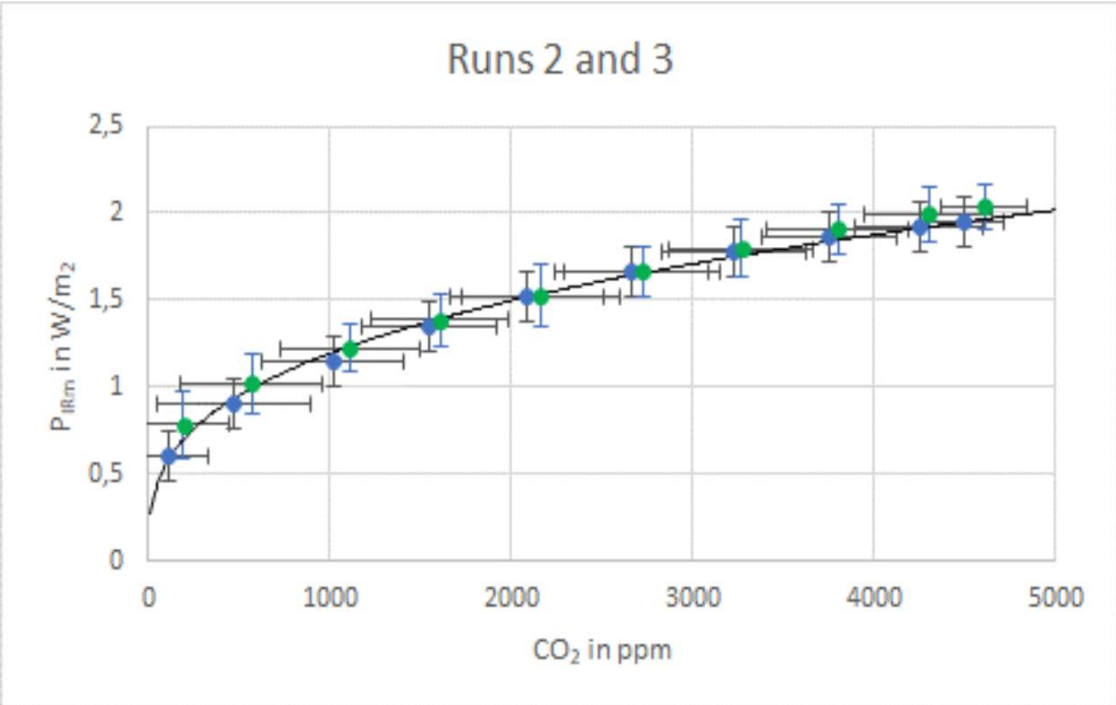

Figure 2. Lab-Mode back-radiation after adding CO2 in 50 ml steps into pure N2 atmosphere

Source: own processing (2023)

should be sufficient for the reader to see that even in a 75 liters cylinder of 1 m length, saturation behavior can be observed with respect to longwave infrared absorption due to CO2 GHG additions. It is easy to understand that for longer air columns (>> 1m) the saturation is already achieved at low CO2 content. Such technical details will be discussed in the forthcoming paper.

3.3 First results of field measurements

To have direct evidence that the addition of CO2 to the current levels of 420 ppm does not cause any measurable additional back radiation, we used the outdoor mode in Fig. 3. The initial results show that the addition of CO2 does indeed not cause any measurable additional back radiation. Since the detector is set to measure only such changes, the measurement confirms the hypothesis of complete saturation of the CO2 bands.

This part of the experiment is set up to use only a realistic environment, i.e. measurements in the real atmosphere. The effects of an increased CO2 concentration in the measurement apparatus simulate an increased total CO2 concentration in the whole atmosphere. This also accounted for any factors, such as aerosols, that would prevent IR radiation from passing through. The use of pure N2 as a test substance only in the 1 m of the measurement apparatus is justifiable, since the back radiation power sensor looks into the entire real atmosphere, except in the first meter. Finally, Freon (C2H2F4) was added, resulting in an immediate increase in backscattered IR

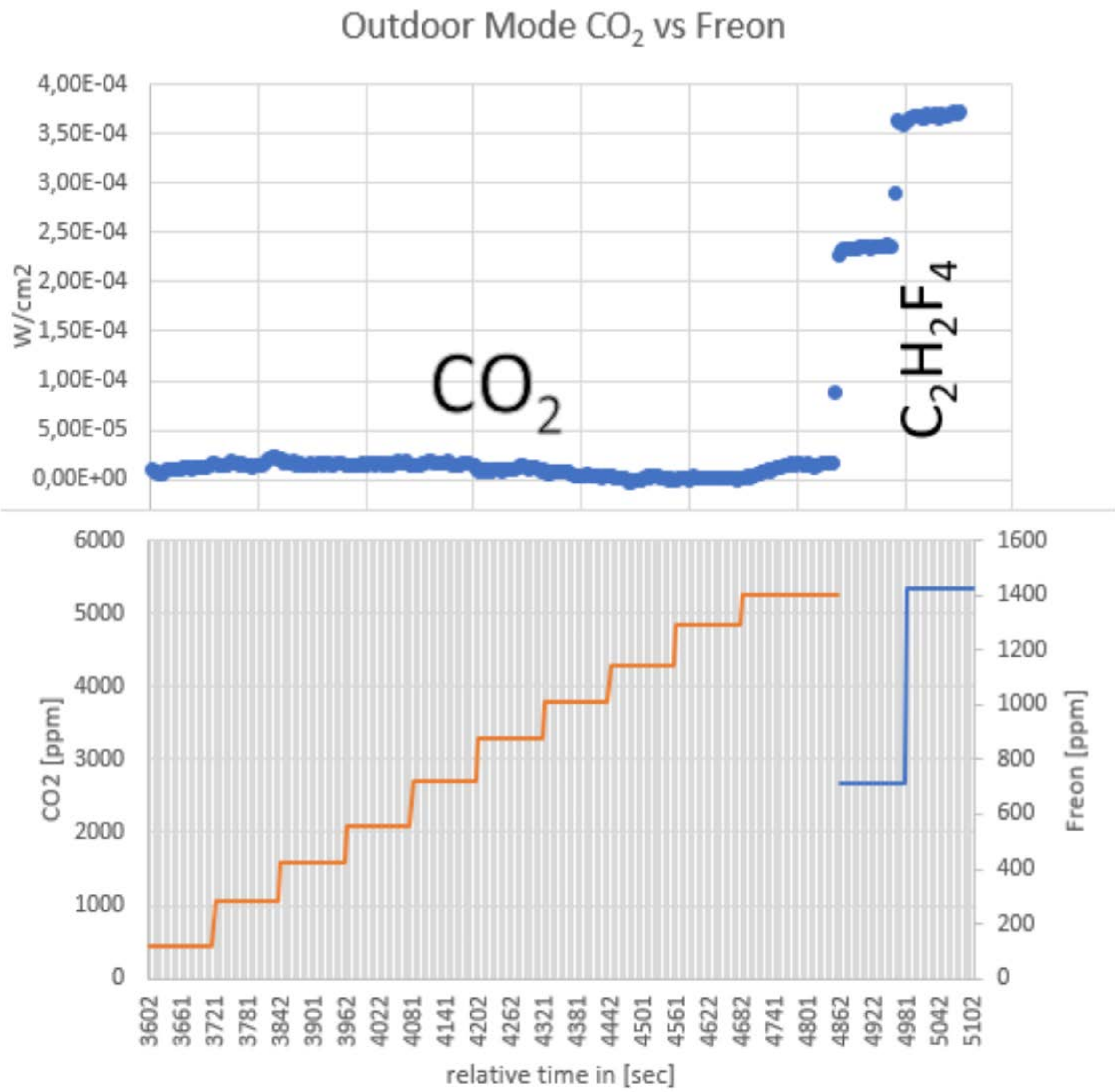

Figure 3. Outdoor-Mode back-radiation after adding first CO2 in 50 ml steps into pure N2 atmosphere.

Source: own processing (2023)

radiation. This proofs qualitatively and quantitively that CO2-contents can increase by a factor of 2 without having catastrophic effects on the global climate. This cannot be said for other GH gases in atmosphere with currently low concentrations. However, since almost 90% of the IR spectrum in the relevant wavelength (13-16um) is already covered by the actual existing gases in the atmosphere (mainly water vapor, CO2, O3 and others) there is not much room left for any absorption by additional IR-active gases.

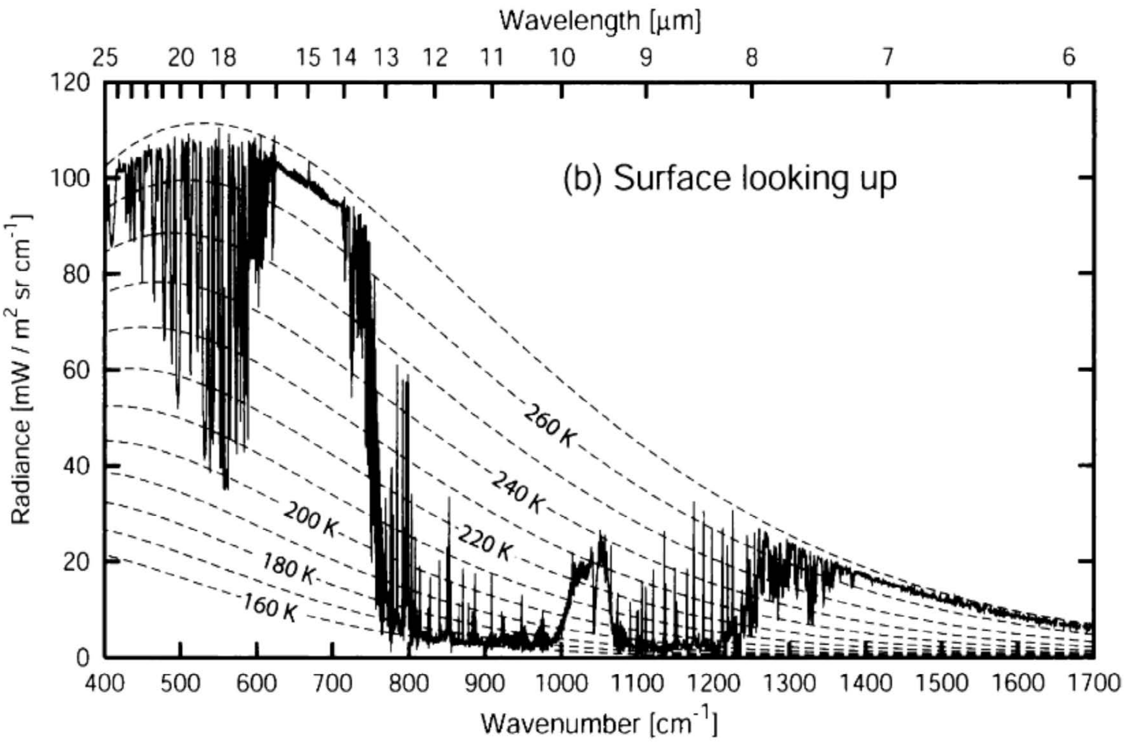

Figure 4: Measurements of the infrared emission spectrum of the cloud-free atmosphere at the surface looking upward. Data courtesy of David Tobin, Space Science and Engineering Center, University of Wisconsin-Madison
Source: Petty, 2006, p. 223
Our measurements correspond well to Fig. 4, which does not support significant Atmospheric Thermal Enhancement (ATE) increase by additional atmospheric CO_2.

3.4 Possible economic impact assessment

Political and economic impact assessment for 3 different stakeholder groups which are:

- EU citizens & Mittelstand
- EU member states &EU
- international corporations

are presented in Table 1 (next page). The following is a summary of the assessments from 6 expert interviews. “Mittelstand” is a very important society group in German-speaking Europe (A, D, CH). The word „Mittelstand“ has no equivalent in English or Slovak. Briefly, “Mittelstand” are SME owners, their family members and sympathizers.

Table 1

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Table 1. Political and economic impact assessment		EU Citizen, "Mittelstand"	EU States, EU	International corporations
1	More conscious use of energy and resources	4 4	3 4	1,5 1
2	Strengthening of regional structures and regional added value	8	5,6	4
3	Jobs in the region	6 4	5 5 4	4 4
4	Green deal, Keynesian approach - artificial increase of demand (like 1930 new deal USA)	3	7	4 4
5	CO2 taxation = increase government revenue to stabilize budget	9	9	2,3
6	Investment uncertainty and creeping devaluation of equipment, real estate, etc.	8,75	5 4,5	5 5 2
7	Price uncertainty - supply	8,75	5 4,5	5 5 3
8	Reduction of individual mobility	7,5	4 8 5	7 2
9	Planned economy and command economy	8	6 5	8
10	Constant increase of prices of all goods, because of rising energy costs	7,6	5 5,3	4,3 9
11	"Mittelstand" will downsize at the expense of corporations	9	5	8,5
12	Gradual collapse of the (export) economy	9	8	6
13	Migration of all (energy-intensive) value-adding businesses to non-EU countries	8	7,3	5 9 5
14	Thus complete dependence on the world market, foreign trade deficit	8	7,75	7 4,5
15	Rise of the shadow economy, bungling, crime (fuel theft, firewood theft)	8,3	6	4,6
16	Competent and capable people emigrate (brain drain etc.)	6,6	7,6	5 3

shows the summary ratings of the expert interviews. For some questions, there are strong divergent assessments by the experts - such as „jobs in the region" or „investment uncertainty". In fact, these topics are very difficult to predict.
In the overall picture, the experts are unanimous in postulating massive effects on EU citizens, EU economy and SMEs in particular.

Ratings: *Green = positive for this stakeholder | Red = negative for this stakeholder*
Black = neutral for this stakeholder | 1 = Minimum impact | 9 = maximum impact

4. Discussion:

In addition, it is worth noting that EU publishes the results of EU-wide surveys at approximately annual intervals to try to show how the majority of the EU population assesses the importance of climate change, the need for action, and the benefits of action (European Commission, 2023a).

EU Press release July 2023: "A huge majority of Europeans believe climate change is a serious problem facing the world (93%), according to a new Eurobarometer survey published today" (European Commission, 2023b).

Looking at the latest survey in detail (European Commission, 2023c) only 17% - instead of 93% of all Europeans - according press release - are considering climate change to be the single most serious problem (page 10), and the trend is downward (18% April 2021). Thus, this somewhat deeper look at the latest Eurobarometer surveys shows the difference between public and published opinion.

4.1 Overview of European Climate legislation

EU climate regulations comprise a multitude of directives and regulations. Their overarching goal is reach net zero CO2 emissions by 2050.

The so called „European climate law" (REGULATION (EU) 2021/1119) came into force in 2021. This Regulation sets out a binding objective of climate neutrality in the Union by 2050. Union-wide greenhouse gas emissions and removals regulated in Union law shall be balanced within the Union at the latest by 2050, thus reducing emissions to net zero by that date, see Fig5.

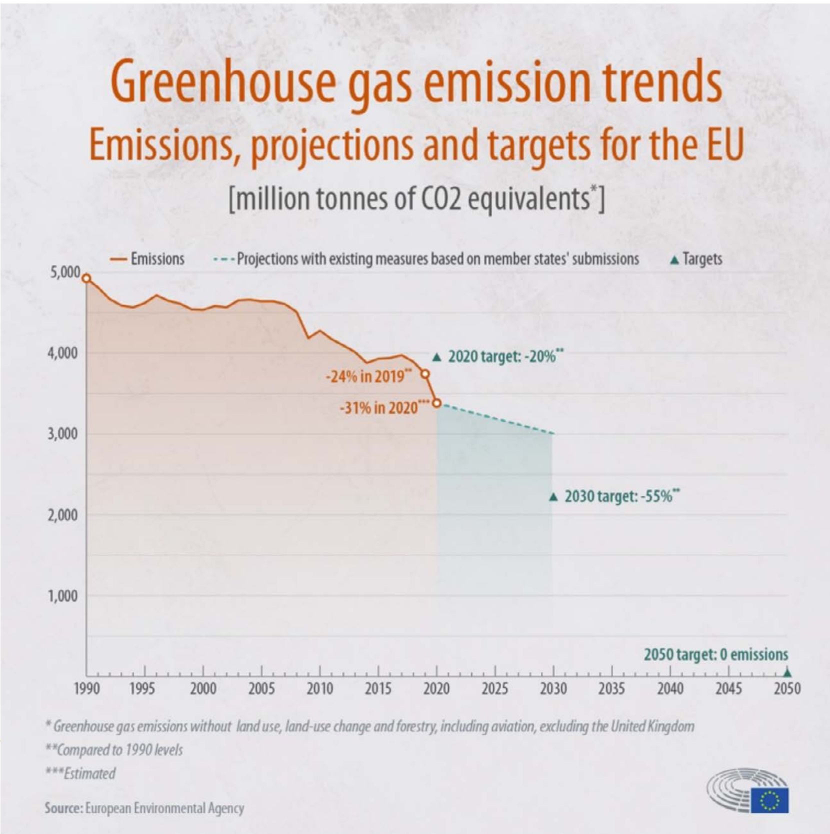

Figure 5. GH gas emission trends, projection and targets EU

Source: (European Parliament, 2018b)

Net zero means that annual carbon dioxide emissions must not exceed annual carbon dioxide sequestration (= uptake and storage of carbon) by carbon sinks. The most important carbon sinks are the growing forests in Europe. New technologies - such as carbon capture and storage (CCS) - may be able to bind CO2 permanently. However, this technology has not yet been developed to market readiness (see Fig.6). The CCS process is also very energy intensive and thus expected to be very expensive.

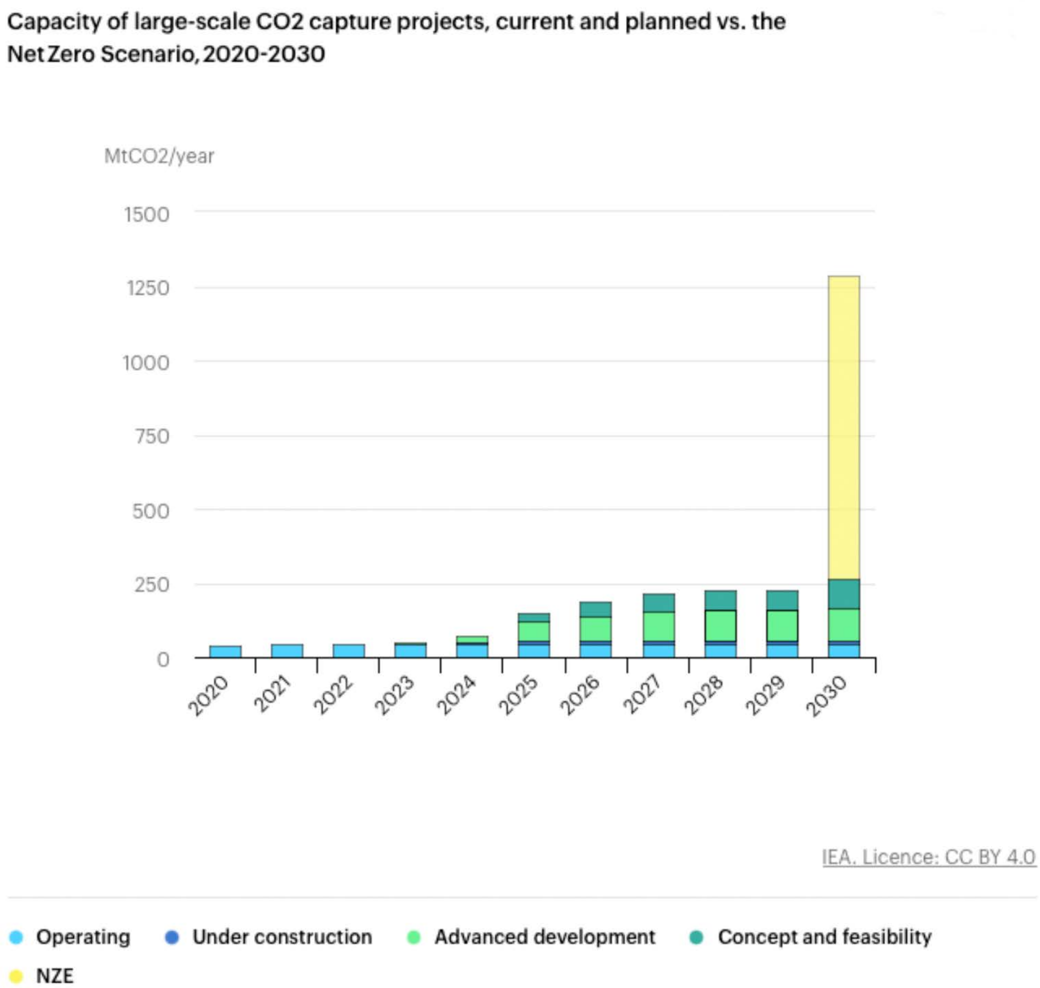

Figure 6. IEA CCU CO2 capture projects, current and planned vs. the net zero scenario 2020-2030

Source: (International Energy Agency, 2020)

Although the „European climate law" will allow for carbon dioxide emissions in the future, reaching net zero requires dramatic and rapid emission reductions.

Article 3 of the „European climate law" describes the tasks of the European Scientific Advisory Board on Climate Change. The board has to consider the latest scientific findings of the IPCC reports and identify actions and opportunities needed to achieve the Union climate targets.

The „European Climate Law" calls climate change an „existential threat" and states that „it is necessary to address the growing climate-related risks to health, including more frequent and intense heat waves, wildfires and floods, food and water safety and security threats, and the emergence and spread of infectious diseases." (European Parliament, 2021)

Article 1 of the REGULATION (2023/857) "on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030" (European Parliament, 2023) „lays down obligations on Member States with respect to their minimum contributions for the period from 2021 to 2030 to fulfilling the Union's target of reducing its greenhouse gas emissions by 30 % below 2005 levels in 2030". Mandatory reduction targets differ between member states. Bulgaria has a reduction target of 10%, Slovakia has a target of 22,7% less emissions in 2030 compared to 2005, while Sweden and Germany have to reduce their emissions by 50%.

Directive 2003/87/EC3 (European Parliament, 2003) established a scheme for greenhouse gas emission allowance trading within the Community.

Member states are allowed to emit a certain amount of CO2 per year. If they exceed this amount, they must purchase allowances. As member states are allowed to emit less and less CO2 per year and the costs for allowances will increase, it is very likely that the emission of CO2 will become extremely expensive in the near future.

4.2 Justifications of EU for Climate legislation and our criticism

The European Climate law is justified by an alleged existential threat and a growing number of deadly natural disasters including extreme weather events and infectious diseases.

Extreme weather events have been recorded for a long time. An overview of the state of studies on extreme weather events in the U.S. is provided by the Climate Science Special Report (CSSR) as part of the Fourth National Climate Assessment (NCA4) (Wehner et al., 2017). Droughts and hurricanes have not become more frequent in the United States (Heim, 2017) (Klotzbach et al., 2018). A recent analysis of the Emergency Events Database (EM-DAT) suggests a linear upward trend to around mid-century of the 20th century, followed by rapid increase to the turn of the new century and then a declining trend through 2022 (Alimonti et al., 2023). Although the increase in heat days over the last hundred years is well documented for Europe, there is no clear evidence of an increase in extreme weather events in Europe. The same is true for floods in Europe (Blöschl et al., 2019). Forest fires in the Mediterranean region have decreased slightly since 1980 (European Environmental Agency, 2021).

On the contrary, the number of deaths from extreme weather events has declined dramatically over the last 50 years (World Meteorological Organization, 2021). Globally, the death rate from infectious diseases has decreased by more than 50% since 1990 (Institute for Health Metrics and Evaluation, 2022).

Taken together, these undisputed facts point at improved living conditions around the world, including in Europe. In light of these findings, the rationale put forward by the EU seems highly questionable.

The rising economic costs of natural disasters are well documented (Centre for Research on the Epidemiology of Disasters, 2023), but can be attributed to the fact that both human population and world economy have grown substantially since 1900. More and more property is being hit by disasters. Florida, a state particularly vulnerable to hurricanes, has nearly doubled its population since 1990 (WorldPopulationReview, 2023). In its latest Assessment Report (Portner et al., 2022), the IPCC notes that “many poor communities, especially in regions with high levels of vulnerability and inequality, are less resilient to diverse climate impacts”. Resilience to natural disasters is provided by improved infrastructure such as flood protection facilities, early warning systems, or emergency vehicles. Effective protection of forests and mangroves will also increase resilience against extreme weather events. None of the above mentioned measures has anything to do with the CO2 content of the atmosphere. On the contrary, the IPCC does not explain how a transition from reliable fossil energy to less reliable renewable energy contributes to building more resilient infrastructure in the poorest countries.

4.3 Other factors to be considered

The U.S. Environmental Protection Agency provides a list of the natural and human-caused factors that influence climate trends, with particular emphasis on the correlation between the increase in atmospheric CO2 and the rise in global average temperature in recent decades (U.S. Environmental Protection Agency, 2023). In a report for the Congressional Research Service, Jane A. Leggett, an expert on energy and environmental policy, uses selected citations from the history of climate science research to illustrate the evolution of scientific understanding and confidence regarding the drivers of recent global climate change (Leggett, 2018). The citations she selected emphasize the central role of man-made CO2 as the primary cause of global warming. Current climate policy focuses monocausal on anthropogenic atmospheric carbon dioxide concentrations, but climate science has yet to conclusively resolve many questions about the drivers and interrelationships of climate. Climate science usually underestimates the importance of astrophysical, geophysical and singular factors, e.g. solar and cosmic radiation variations (Svensmark et al., 2021), geomagnetic disturbances, radioactive decays and radiochemical effects and energetic geological events. Only recently has it been found that underwater volcanic eruptions (Jenkins et al., 2023) can change seawater temperatures by an order of magnitude. Another fact that has not been as well studied was the change in radioactivity of the seafloor due to underwater nuclear bombing tests in the years between 1950 – 1970. The activation of rare earth materials (Stosch, 2016) (Stettler et al., 1979) on the seafloor is a source of energy and warms the water. On the other hand, no reasonable explanation has been found for the decline in temperatures over an extended period after 2000. In a sound and strong climate model that clearly demonstrates the detrimental influence of anthropogenic carbon dioxide, it should not be possible to have periods of falling or stagnating global average temperatures while carbon dioxide levels are steadily increasing. But we must insist that such deviations from predictions be plausibly analyzed and that there be a serious and honest discussion about the limitations of predictions and the risks of wrong IPCC conclusions. Not only is the path to addressing negative environmental impacts at stake, but we also face the risk of taking wrong and irreversible actions that could in fact lead to a catastrophic outcome for citizens and the economy as opposed to the expected benefits.

4.4 Is climate science really settled?

There is reason to doubt it. Science does not understand all the mechanisms behind the actual climate. Most predictions are based on complicated, bloated computer models that are not tested for robustness. Systematic errors and assumptions to achieve favorable outcomes need to be exposed. Currently a discussion about the climate narrative in the EU is hardly possible, neither on a political nor scientific level. This circumstance is evocative of the well-known human psychological vulnerabilities in connection with „group think“ (Janis, 1972) and the associated problem of fatal wrong decisions.

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Science must be open and controversial to guarantee successful insight. Only scientific discourse - ideally supported by real measurements and experiments - leads to real solutions and clarifications. In the past, scientific and political misconceptions have been challenged by experimental verification and direct observations, such as the heliocentric world view (16th century) or Albert Einstein's proof of general relativity on May 29, 1919, on the occasion of a solar eclipse and the accompanying measurements. Measurements and experimental confirmations/falsifications create an important gain in knowledge. To initiate and contribute to an objective scientific discussion, we have developed a simple experimental setting that we propose for further, more rigorous studies.

Conclusion

The described regulations of the „European climate law" will have a massive impact on European citizens and our economy. The European climate law is being justified by an alleged existential threat from a growing number of catastrophic natural disasters, including extreme weather events and infectious diseases.

This paper questions many of the arguments and facts used to support such rigid legislation measures. Such controversial issues cannot be considered as scientific settled. Political decisions made on an unsettled basis bear the risk of social disaster due to wrong predictions from hypothetical computer models.

Very alarming is also the fact that EU internal discussions and decisions are passed on to the outside (the latest scientific findings of the IPCC reports come into play).

Cited studies of renowned experts and first results of our own experimental laboratory and field measurements raise reasonable doubts about the EU & IPCC climate narrative. The authors are also very concerned that there is no open political and technical discussion on the topic of global warming and its causes postulated by the IPCC and the EU. This paper is intended to help renew a factual discussion.

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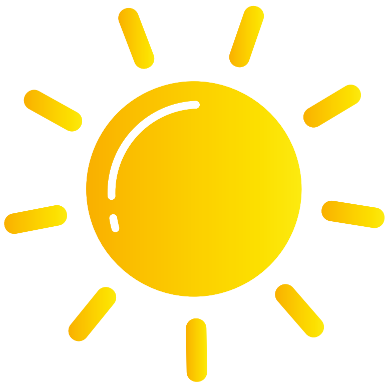

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