Undue climate haste

ABOUT THE NECESSITY,
FEASIBILITY AND AFFORDABILITY
OF EU CLIMATE POLICY.

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EUROPEAN CONSERVATIVES AND REFORMISTS

NEEDLESS CLIMATE HASTE

About the necessity, feasibility and affordability of EU climate policy

An Essay commissioned by the ECR Group
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Marcel Crok (CLINTEL)

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The ECR Group: "If the EU and its global partners really want to tackle issues such as climate change, recycling, waste, emissions and pollution, food quality and food security, then the EU must take sensible and sustainable measures that do not impose unnecessary and costly burdens on businesses and Member States. Instead of unrealistic goals that will never be met or properly implemented, the ECR Group supports an ambitious, step-by-step and sensible approach that all Member States can support."

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The Climate Intelligence foundation (CLINTEL) is an independent foundation that operates in the fields of climate change and climate policy. CLINTEL was founded in 2019 by emeritus professor of geophysics Guus Berkhout and science journalist Marcel Crok. CLINTEL's main objective is to generate knowledge and understanding of the causes and effects of climate change as well as the effects of climate policy.

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THE EU SETS THE BAR VERY HIGH

The European Union has decided it wants to be net-zero carbon by 2050. This would make “Europe” the world's first “climate neutral” continent. This intention is generally received enthusiastically in the media. And politicians themselves like to point out the benefits of a “green economy": it would strengthen the economy and create jobs.

Although the goals have not yet been definitively established in European legislation, this process has been set in motion. [1]

The direct reason for this ambitious climate policy is the Paris climate agreement. In this agreement, almost all the countries in the world agreed not to let the temperature on earth rise more than two degrees Celsius above the pre-industrial level or preferably even below 1.5 degrees. The current amount of warming is approximately one degree Celsius.

Translated into emissions, this goal, according to researchers, comes down to the world no longer being allowed to emit any CO_2 by 2050. The figure below is taken from the 2018 Intergovernmental Panel on Climate Change (IPCC) Special Report 1.5 C.[2] The message from the IPCC: it is difficult, but it is possible.

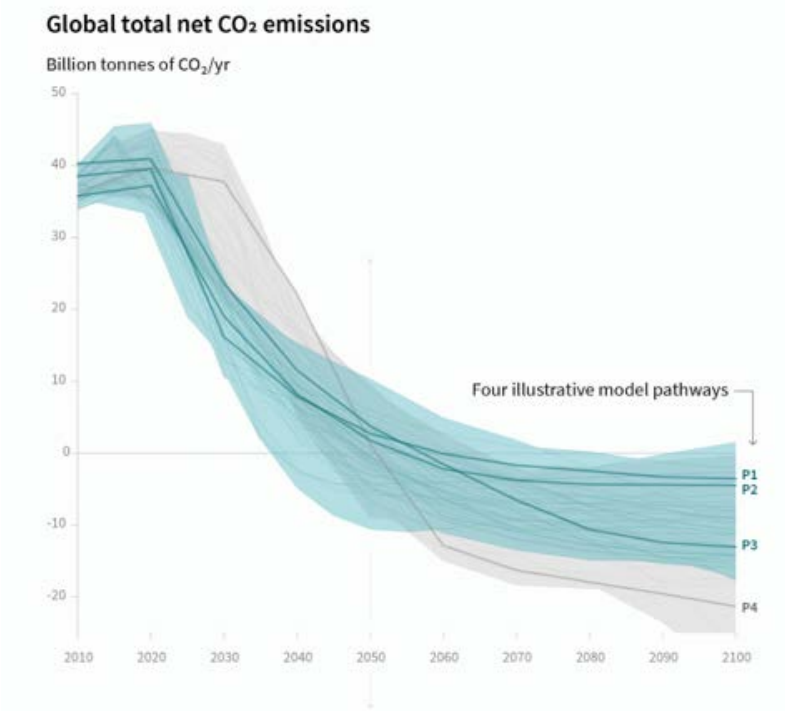

Fig. 1: Four possible paths to stay below 1.5 degrees Celsius. Source: IPCC SR15 Report

In any case, the EU has taken the IPCC’s message to heart and is the first continent to actually make a serious attempt to reach the net-zero carbon goal by 2050. This doesn't necessarily mean that fossil fuels will no longer be used at all by 2050, but rather that the CO_2 emitted by coal, oil or natural gas will be stored above ground (in trees) or underground (Carbon Capture and Storage, CCS). Fig. 2

1 https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1588581905912&uri=CELEX:52020PC0080
2 https://www.ipcc.ch/sr15/

shows how various sectors must work towards almost zero carbon emissions in the coming decades and what contribution is expected from negative emissions.

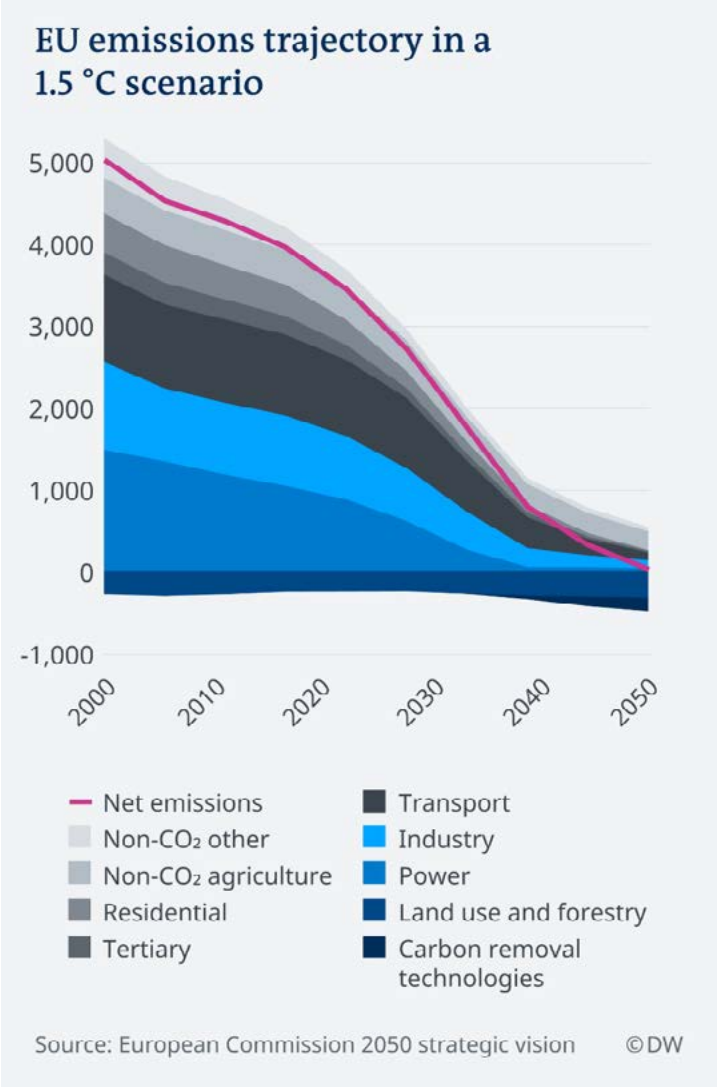

Fig. 2: Scenario for the EU to achieve the targets for 2050. Source: https://www.dw.com/en/net-zero-by-2050-what-does-it-mean/a-48958487

The aim of this essay is to look at the necessity, feasibility and affordability of this EU policy.

International climate policy officially started in 1992 with the Rio climate treaty.[3] Since then, all member countries have met annually at a so-called Conference of the Parties (COP) to negotiate objectives and measures. [4]

IN FACT, NO EFFECT OF INTERNATIONAL CLIMATE POLICY CAN BE DISCERNED SINCE 1992.

Although in more recent years adaptation (i.e. adaptation to climate change) has gained attention, the annual climate summits in more recent years have always been dominated by mitigation (trying to prevent climate change through CO_2 reduction). This stems from a sentence set out in the Rio Climate Convention: The ultimate objective of the Convention is to stabilise greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with

3 https://unfccc.int/about-us/about-the-secretariat
4 https://unfccc.int/process/bodies/supreme-bodies/conference-of-the-parties-cop

the climate system."[5]

Thus, in 1992, there was already talk of stabilising greenhouse gas concentrations in order to prevent disruption of the climate by humans. The word "prevent" automatically leads to a policy that is fully focused on mitigation and not on adaptation. We will see later whether that was a wise choice. As an aside, this happened at a time (1992) when the IPCC had not yet provided proof that climate change was man-made.[6] Only in the second IPCC report would the IPCC, after much discussion, state that: "The balance of evidence suggests a discernible human influence on global climate."

Since 1992, efforts have therefore been made internationally to curb the greenhouse gas concentration in the atmosphere. This was followed by the Kyoto Protocol in 1997, the Copenhagen Accord in 2009 and, of course, the 2015 Paris Climate Agreement. How successful have these agreements been so far in "stabilising greenhouse gas concentrations"?

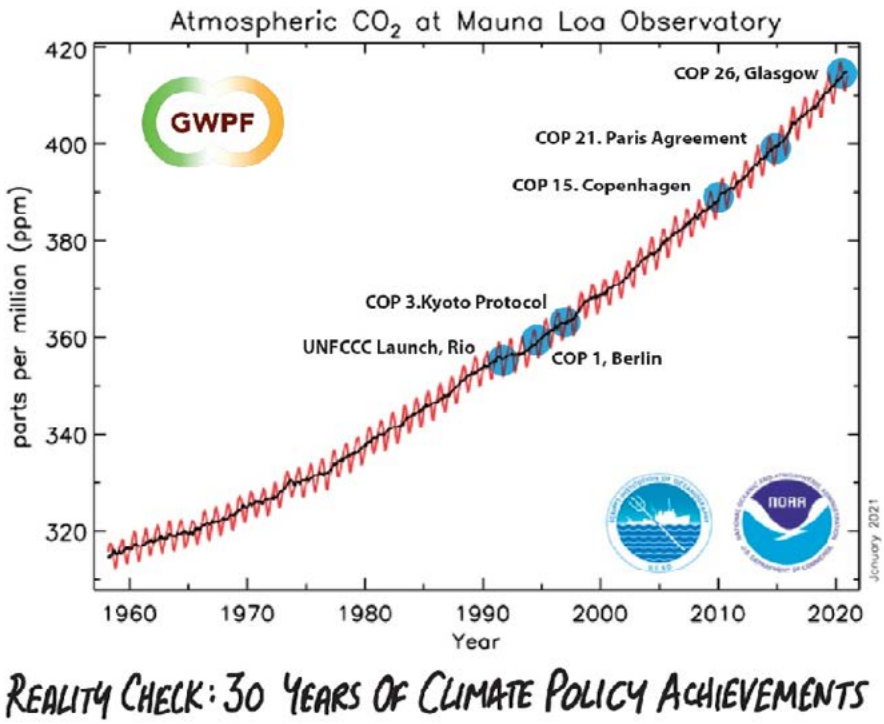

Fig. 3: The CO2 concentration as measured since 1958 on Mauna Loa, a volcano in Hawaii. The various climate conferences added by the Global Warming Policy Foundation. Source data: NOAA

Since the measurements started in 1958, there has been an annual increase, first by about 1 ppm per year (parts per million) and nowadays by around 2 to 2.5 ppm per year. Even in 2020, the year in which the corona pandemic led to a deep economic recession and, with it, a spectacular drop in greenhouse gas emissions of up to 7%, the CO_2 concentration in the atmosphere continued to rise.[7] In fact, no effect of international climate policy can be discerned since 1992.

This all has to do with the strong link between energy use and prosperity.

5 https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change

6 For the history of this, see Bernie Lewin's excellent book, *Searching for the Catastrophe Signal*, https://www.amazon.com/Searching-Catastrophe-Signal-Origins-Intergovernmental-ebook/dp/B077N36Q3Z

7 https://www.dw.com/en/global-carbon-emissions-down-by-record-7-in-2020/a-55900887

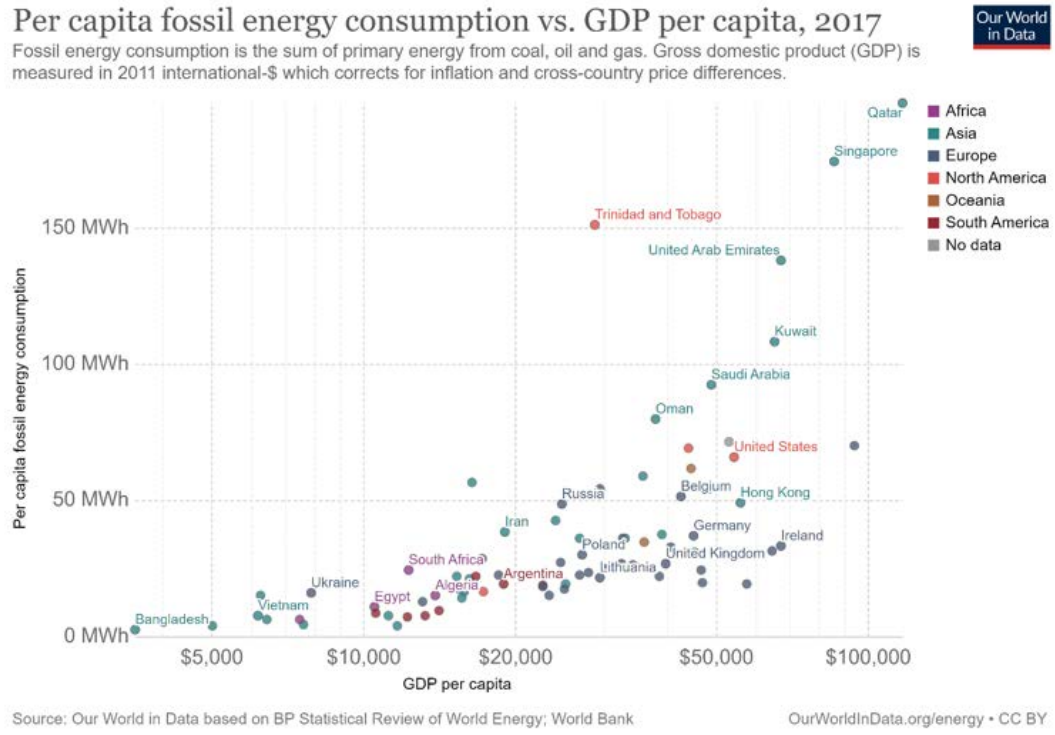

Fig. 4: Per capita use of fossil fuels plotted against log (GDP per capita). Source: Our World in Data

The graph above from the Our World in Data website shows an almost linear relationship between prosperity and the consumption of fossil fuels. The illustration below clearly shows how the spectacular decrease in extreme poverty has gone hand in hand with the equally spectacular increase in the use of fossil fuels.

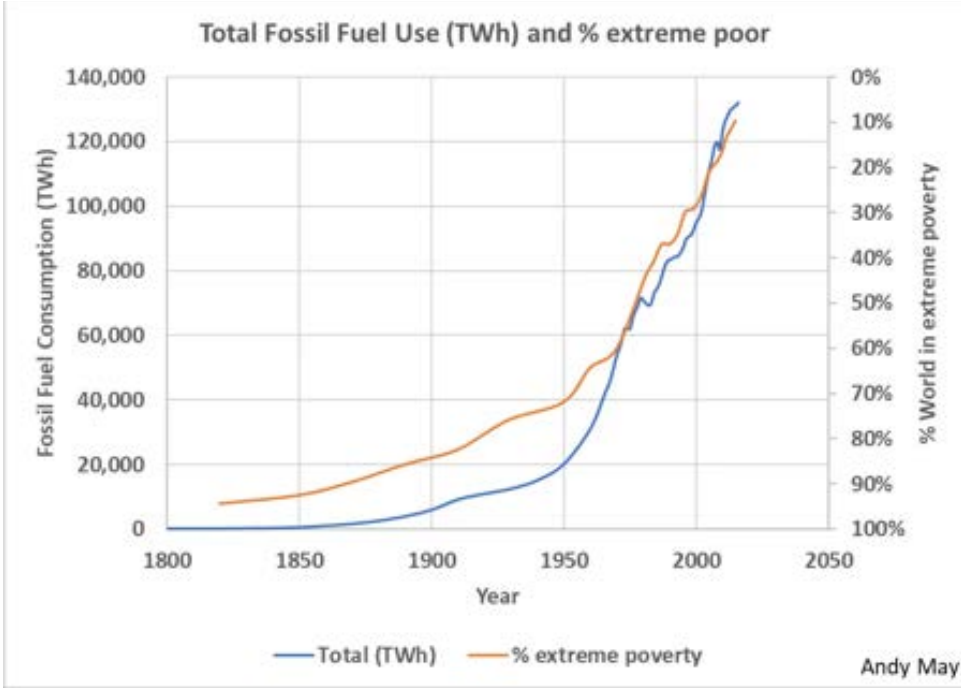

Fig. 5: Fossil fuel consumption and the development of extreme poverty. Source: Andy May.

The EU has no deliberate intention of jeopardising our European prosperity, of course. There seems to be a strong consensus that a "green" and carbon-free economy can also be a prosperous economy. However, there are no historical parallels to this experiment yet and the EU therefore finds itself in unexplored territory with its policies.

HOW GREAT IS THE CHALLENGE AHEAD FOR THE EU?

As shown in Figure 3, the CO_2 concentration in the atmosphere has continued to rise steadily despite 30 years of climate diplomacy. Researchers argue that to stay below 1.5 degrees worldwide, we should stop emitting greenhouse gases altogether by around 2050. Given the continuous upward trend so far, this seems like a hopeless mission. The many international energy scenarios drawn up by, for example, the International Energy Agency (but also by oil companies such as Shell and BP) do not consider it likely that the world will be heading for zero emissions by 2050. Presented here to illustrate this are scenarios from BP up to 2040:

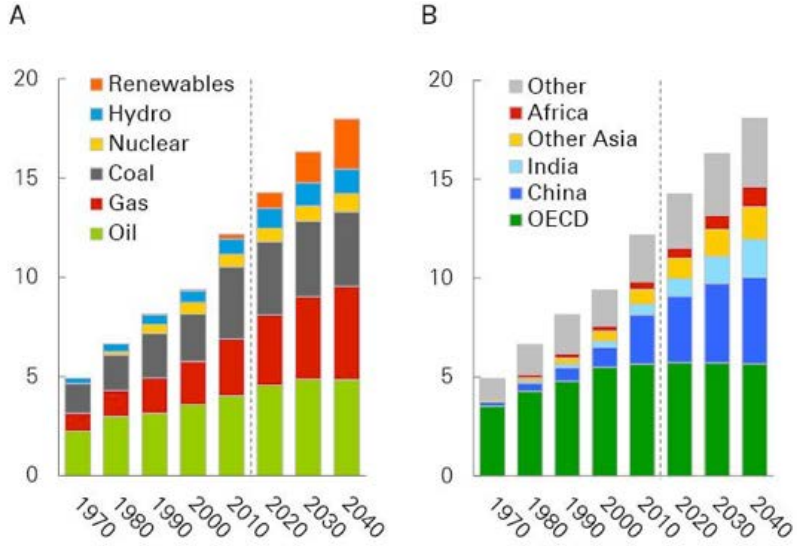

Fig. 6: Primary energy demand (btoe) by (a) fuel and (b) region. Source: BP World Energy Outlook 2018.

Although it is true that energy demand in OECD countries is not expected to grow significantly, China, India, the rest of Asia, Africa and South America nevertheless still have important steps to take in their economic development, coupled with a sharp increase in energy demand.

Although the contribution of renewable energy does increase significantly in BP's scenarios, it is unfortunately not even enough to keep up with the growing demand for energy. The demand for oil and natural gas in particular will therefore continue to rise.

China recently announced with great fanfare that it wants to be "carbon neutral" by 2060. It is aiming for a peak in CO_2 emissions by around 2025.[8] But the question is how realistic such resolutions are. Earlier in 2020, the Reuters news agency reported that China has 250 GW of coal-fired power plants under construction or at the planning stage.[9] China alone accounts for 28% of global CO_2 emissions. China has already promised in the Paris Climate Agreement that it will try to peak emissions by 2030. President Xi Jinping's new announcement does nothing to change that. In other words, China can and probably will continue to emit more CO_2 up to 2030.

Countries are tumbling over each other in their ambitions to be carbon neutral or climate neutral as quickly as possible. But talking about ambitions is easier than fulfilling them. None of the coun-

8 https://www.nature.com/articles/d41586-020-02927-9
9 https://www.reuters.com/article/china-coal/china-has-250-gw-of-coal-fired-power-under-development-study-idINL4N2E20HS

tries, including the EU with its Green Deal[10] , has a concrete plan on exactly how fossil fuels will be replaced, let alone what the costs and benefits of such a plan would be.

Anyone who starts calculating the task facing the world, as the American researcher Roger Pielke Jr has done, will soon discover that banning all fossil fuels by 2050 is virtually impossible. Here is a graph that Pielke published in 2019, but which can still be used as an illustration today.

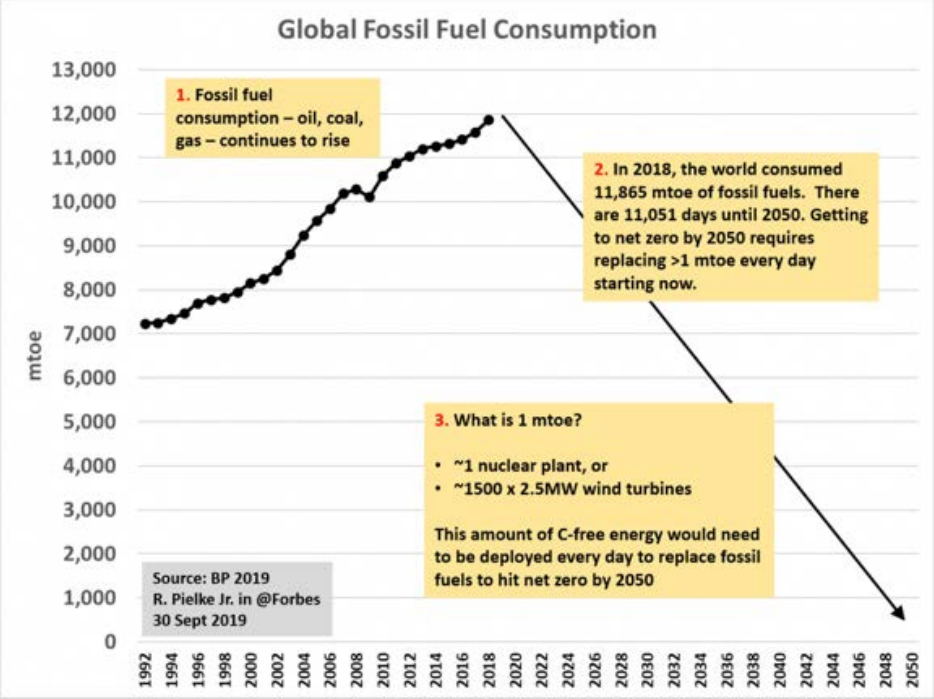

Fig. 7: The scale of the challenge to achieve net-zero carbon dioxide emissions in 2050. https://www.forbes.com/sites/rogerpielke/2019/09/30/net-zero-carbon-dioxide-emissions-by-2050-requires-a-new-nuclear-power-plant-every-day/?sh=34ed315435f7

The figure only shows the increase in fossil energy consumption in recent decades. A straight line was then drawn down from 2019 to reach zero in 2050. In total, the world now consumes almost 12,000 million tonnes of oil equivalent.[11] At the time the article appeared, there were still more than 11,000 days to go before 2050 has arrived. So the task is very simple: every day from now until 2050, at least 1 million tonnes of oil equivalent will have to be replaced by a carbon-free alternative, be it nuclear energy, solar or wind.

But even then we are not quite there yet. Because, as can already be seen in the BP scenario (Fig. 6), energy demand will continue to rise in the coming decades. The International Energy Agency (IEA) estimates this at about 1.25% per year. This means that, converted accordingly, an additional 5,800 million tonnes of oil equivalent will be added. So, on average, 1.6 million tonnes of oil equivalent per day will have to be replaced by a fossil-free alternative?

How much is 1 million tonnes of oil equivalent? This roughly equates to the annual production of a nuclear power plant with a capacity of 1000 MW. Three of these nuclear power plants will therefore have to be commissioned worldwide every two days. After sixty years of nuclear energy, there are some 450 nuclear power plants worldwide. That's an average of less than eight a year. Over the next thirty years, however, 550 (!) new nuclear power plants will have to be added every year to rid the world of fossil fuels.

10 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_nl
11 Coal and natural gas have been converted to oil equivalent.

Translated into the EU context, you can roughly divide these numbers by ten.[12] So 55 new nuclear power plants in the EU every year for the next thirty years.

OVER THE NEXT THIRTY YEARS, HOWEVER, 550 (!) NEW NUCLEAR POWER PLANTS WILL HAVE TO BE ADDED EVERY YEAR TO RID THE WORLD OF FOSSIL FUELS.

But many countries, especially in the West and including the EU, are turning their backs on nuclear energy. The best-known example is of course Germany, which decided to close all nuclear power plants after the nuclear disaster in Fukushima. This process should be completed in 2022. Recently, the new government in Belgium also decided that the seven nuclear power stations in the country should close by 2025.[13] However, nine new gas-fired power stations will be needed instead. Not really the direction we want to go, because it means we're now replacing CO_2-free energy with fossil energy.

The EU has a strong preference for renewable energy sources such as solar, wind and biomass. What if we want to achieve this task using wind energy, for example? That, Pielke asserts, equates to 4,500 x 2.5 MW wind turbines every two days. Worldwide, this means every two days up to 2050. Or, translated into the EU context, 450 wind turbines every two days, more than 82,000 wind turbines annually. Where on earth would you put them all?

"OR, TRANSLATED INTO THE EU CONTEXT, 450 WIND TURBINES EVERY TWO DAYS, MORE THAN 82,000 WIND TURBINES ANNUALLY"

These are very simple calculations of course, and there are many other challenges because not only will it be necessary to produce much more CO_2-free energy, 1.5 million tonnes of oil equivalent will also have to be taken from the market every day. Coal and gas plants will have to be closed early and compensation paid to the owners for this. Steel mill furnaces will have to be filled with something other than coal. There aren't even any signs of a solution to many of these challenges.

An inevitable conclusion is that the scale of the task the EU has set itself is colossal. Now, colossal does not necessarily mean impossible but, to gain trust and confidence, the EU would have to translate its goals into concrete plans. Quantitative plans to be more precise, i.e. how much of what type of CO_2-free energy will become available when and at what pace. And what are the costs and benefits of such plans.

12 The EU emits just under 10% of global CO2 emissions. https://ourworldindata.org/co2-emissions
13 https://nl.wikipedia.org/wiki/Kernuitstap

"THE COST OF DOING NOTHING IS MUCH HIGHER"

The work of politicians and policy-makers largely consists of making trade-offs. There is a certain budget and how much of it goes where? Since it concerns public money, it is logical for politicians to try to spend this money in the most useful and efficient way possible.

In the case of climate change, it is tempting to think that the lower global warming is, the better it is for humans and animals and therefore also in financial terms. After all, less warming (possibly) means less climate damage. That is why it appears logical that the EU and many countries in the world should strive to achieve the most ambitious goal of limiting global warming to 1.5 degrees worldwide.

But this is only half the story.

As we have seen before, setting more ambitious goals means replacing fossil fuels with CO_2-free alternatives much faster. These alternatives, however, are generally more expensive and therefore slow down economic growth. Climate economists therefore try to use models to estimate the impact of both climate change itself and climate policy. A point can be reached where the conclusion is that the cure is worse than the disease, i.e. that the costs of your climate policy are higher than the costs of the actual climate change that may be expected.

It goes without saying that EU climate commissioner Frans Timmermans underpins his decisions on European climate policy with these kinds of economic cost-benefit considerations. For example, he said during a public appearance at the end of 2019: *"the costs of non-action are tremendously high."*[14]

UN chief António Guterres also spoke out to this effect: *"Delayed climate action will cost us vastly more each year in terms of lost lives and livelihoods, crippled businesses and damaged economies. The highest cost is the cost of doing nothing"*.[15]

So the message is clear: doing nothing or doing something too late is more expensive than taking action now as soon as possible (read: reducing CO_2). During these kinds of public appearances, it is unclear what Timmermans and Guterres base these claims on, and a search of the immense Brussels paper mountain does not lead to a clear answer either in this regard.

If you search for "EU cost and benefits of climate policy", you will end up at a very relevant-looking EU website[16], but even there you won't find any substantiation that the costs of doing nothing are much higher than the costs of EU climate policy.

The fact that proper substantiation of the costs and benefits of climate policy is (often) lacking, not only within the EU but also elsewhere, is also noted by the Danish environmental economist Bjorn Lomborg in his book *False Alarm*, published in 2020.[17] In his book, Lomborg specifically addresses the question of where the optimum balance lies between the costs of climate policy and the costs of climate change. He relies, among other things, on the work of the American climate economist William Nordhaus, who received the Nobel Prize for Economics in 2018 for his contribution to the climate economy.[18]

14 https://euobserver.com/environment/146830
15 https://unric.org/en/petersberg-climate-dialogue-the-highest-cost-is-the-cost-of-doing-nothing/
16 https://ec.europa.eu/jrc/en/research-topic/costs-and-benefits-climate-policies
17 https://www.basicbooks.com/titles/bjorn-lomborg/false-alarm/9781541647480/
18 https://www.nobelprize.org/prizes/economic-sciences/2018/nordhaus/facts/

In support of his book False Alarm, Lomborg also published a scientific article in which he focuses on the costs of meeting the voluntary pledges made by countries to the Paris Climate Agreement.[19] The EU pledged to emit 40% less CO_2 in 2030 than in 1990. In his paper, Lomborg estimates the cost of meeting that target - expressed as a decrease in GDP - at a 1.6% drop in GDP by 2030, which equates to €287 billion. But in practice, Lomborg warns, these costs will be twice as high on account of the EU not opting for the cheapest solutions (in this case, in particular, replacing coal with natural gas), but mainly focusing on the growth of wind and solar energy.

At the end of 2020, the EU raised its ambition for 2030 from a 40% reduction to a 55% reduction in CO_2 compared with 1990. In a response, Lomborg complimented the EU on calculating the economic impact of this extra ambition.[20] According to the EU, this amounts to a 0.39% decrease in GDP.[21] According to Lomborg, this already amounts to about €1.3 trillion.[22] However, Lomborg warns, given that the EU uses rather optimistic models, it is more likely that the real cost will amount to 4 to 5 trillion euros.

By reducing emissions more rapidly, it is estimated that the EU will emit an additional 12.7 gigatonnes of CO_2 less, cumulatively, by 2100, see Fig. 8, which Lomborg posted on Twitter and LinkedIn.[23]

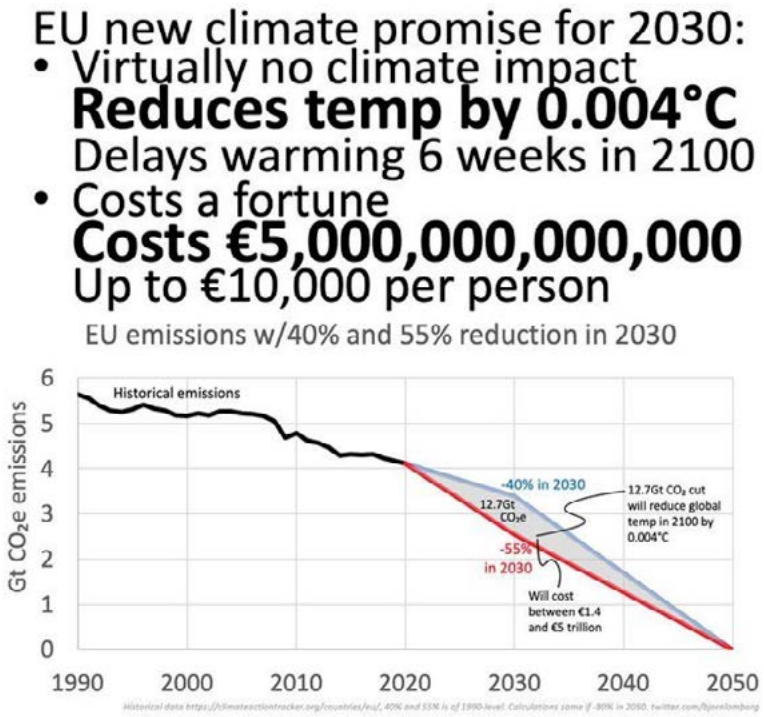

Fig. 8: The consequences of the EU's additional climate ambition by 2030. Source: Lomborg

19 https://www.sciencedirect.com/science/article/pii/S0040162520304157
20 https://www.euractiv.com/section/climate-environment/opinion/eu-must-get-smarter-to-lead-on-climate-change
21 https://ec.europa.eu/clima/sites/clima/files/eu-climate-action/docs/impact_en.pdf
22 One trillion equals 1000 billion
23 https://www.linkedin.com/posts/bjornlomborg_the-eu-wants-to-save-the-world-with-climate-activity-6749658999043493888-w0-0

However, it will have a negligible impact on the temperature in 2100 (0.004°C) and that at a huge cost amounting to €10,000 for every European.

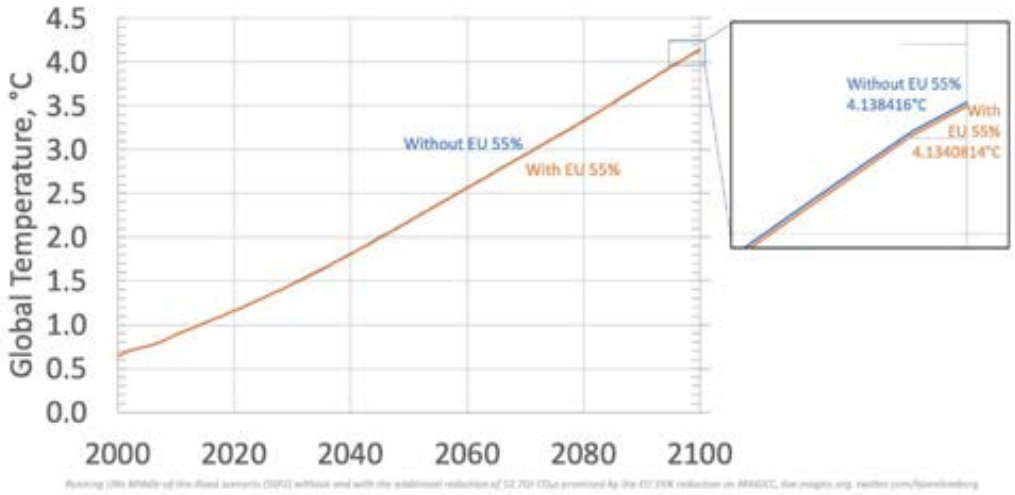

Fig. 9: Effect of the EU's recently increased ambition to achieve a 55% reduction by 2030 on global temperature. Source: Lomborg[24]

Lomborg believes there is another way of putting the costs and benefits of this policy in perspective. According to the average of a whole series of models, the "climate cost"[25] of emitting one tonne of CO_2 will be an estimated €27 by 2030. The extra 12.7 gigatonnes saved will therefore yield more than €0.3 trillion in reduced climate damage. But if the cost to the economy is €1.3 to 5 trillion, that's a very bad deal, says Lomborg.[26]

ACCORDING TO LOMBORG, THE PARIS CLIMATE AGREEMENT IS BY FAR THE MOST EXPENSIVE AGREEMENT IN HISTORY.

In his book and paper, Lomborg estimates the total cost of the Paris Climate Agreement at $1,000-2,000 billion per year from 2030. Considering that the global economy currently stands at $80,000 billion, that is a substantial cost. There has never been an official cost estimate of the Paris Agreement, says Lomborg, and if you look at the numbers he comes up with, you can understand why. According to Lomborg, the Paris Climate Agreement is by far the most expensive agreement in history.

And to think that the agreement is far from doing what it should do, namely keeping the world below two degrees or preferably even below 1.5 degrees. According to Lomborg, the voluntary pledges of the countries that have signed the Paris Agreement add up to a mere 1% of the reduction needed to stay below two degrees.

24 https://twitter.com/BjornLomborg/status/1333023653357887489
25 This is also called the Social Cost of Carbon (SCC), a term about which a separate report can be written. More on this indicator later in this essay.
26 https://www.euractiv.com/section/climate-environment/opinion/eu-must-get-smarter-to-lead-on-climate-change/

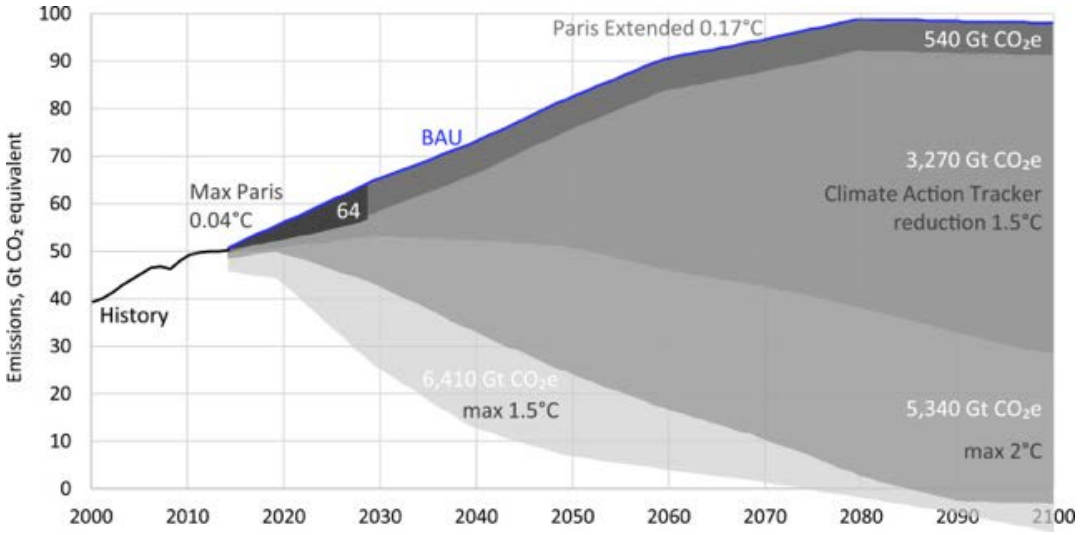

Fig. 10: Emission reduction according to agreements in Paris, plus emission reduction required in the future to stay below 2 or 1.5 degrees. Source: Lomborg 2020

Added together, the agreements in Paris – if all countries adhere to them – amount to a reduction of 64 gigatonnes of CO_2 equivalent. If countries maintain their reductions after 2030, an extra 540 GT of CO_2 equivalent will be added. Lomborg has been attacked for his estimates by the Climate Action Tracker website, among others, which has calculated a much higher contribution from "Paris". According to Lomborg, however, this is due to the higher expectations of Climate Action Tracker for after 2030. These are therefore not commitments that countries have already made in Paris.

Lomborg has also indicated how much reduction would be necessary to remain below two degrees (5430 GT CO_2e) and under 1.5 degrees (6410 GT CO_2e). The 64 gigatonne commitment amounts to 1.2% for the first and exactly 1% of what would be needed for the second.

What are the benefits in terms of less warming? The 64 gigatonnes of CO_2 equivalent that countries are trying to achieve between 2015 and 2030 will lead to approximately 0.04 degrees Celsius less warming in 2100, according to Lomborg (who uses the models of the UN itself). If countries continue to achieve these reductions after 2030, the contribution will be 0.17 degrees less warming in 2100. Not negligible, but not nearly enough to stay below two degrees. And the costs of this are already astronomical.

It is clear that Lomborg is not a fan of the current global approach to climate change. It is expensive and inefficient. So how should it be done according to Lomborg? The most efficient way, something that is said by virtually all climate economists, is a worldwide CO_2 tax. Condition is that it would then have to be the same all over the world and should gradually increase. However, Lomborg, Nobel laureate William Nordhaus and other economists acknowledge that the likelihood of such a tax being introduced worldwide is close to zero.

It is still illustrative to see what, for example, the Nordhaus (DICE) model says about the costs of climate change and climate policy, assuming that such a CO_2 tax were to be introduced worldwide.

Below is an illustration from Lomborg's recent paper, which is based on the Nordhaus model.

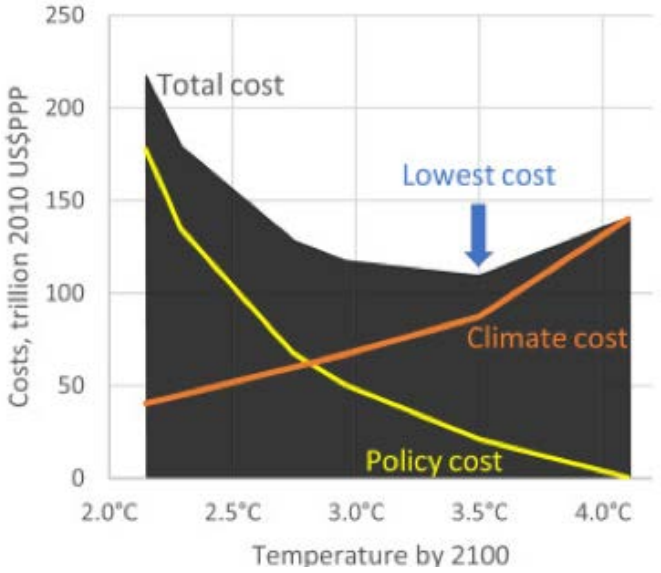

Fig. 11: Total costs of climate change and climate policy over a period of five centuries, set against the temperature increase in the year 2100. Source: Lomborg 2020

For this graph, Nordhaus had his model simulated five centuries ahead. The costs are the total (discounted) costs of climate damage and climate policy over this period, but related to the degree of warming that will be achieved in the model in 2100.

> IT WILL COME AS A SURPRISE TO MANY, BUT THE LOWEST TOTAL COSTS ARE ACHIEVED WITH 3.5 DEGREES CELSIUS WARMING IN 2100, WELL ABOVE THE INTERNATIONALLY AGREED TWO-DEGREE LIMIT.

It will come as a surprise to many, but the lowest total costs are achieved with 3.5 degrees Celsius warming, well above the internationally agreed two-degree limit.

Does Nobel Prize winner Nordhaus agree? Yes. In his Nobel Prize acceptance speech[27], he showed the illustration below:

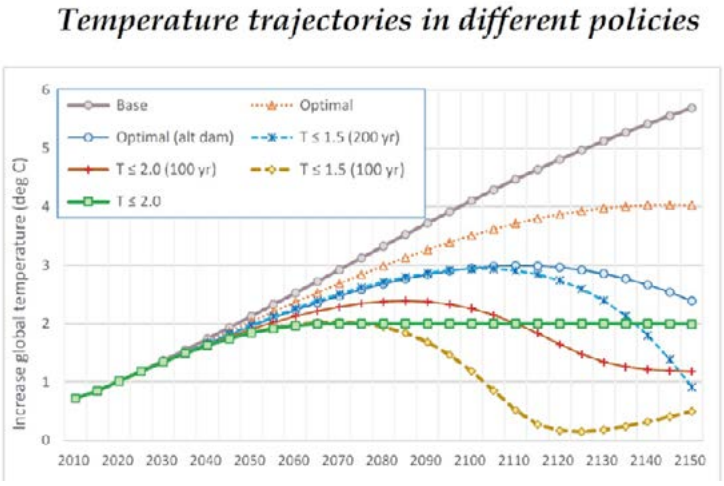

Fig. 12: Slide 6 from William Nordhaus's Nobel Prize acceptance speech. The optimal cost path leads to four degrees of warming in 2150.

27 https://www.nobelprize.org/prizes/economic-sciences/2018/nordhaus/lecture/

These paths have the following costs:[28]

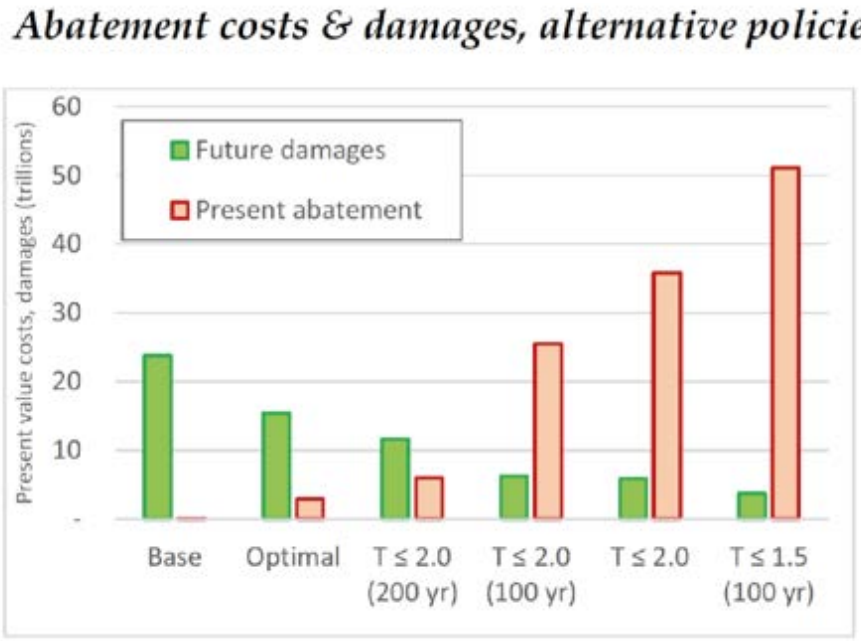

Fig. 13: Costs of climate policy and future climate damage. Source: Nordhaus

In the optimal path, according to Nordhaus, we therefore accept considerable damage from climate change (green bar) and we will reduce CO_2, but at a slower pace (it still concerns halving CO_2 emissions in the next 50 years, which is already a gigantic challenge), so that the costs of the climate policy remain manageable. In net terms, this is the cheapest way forward.

Note that in Figure 11 above, from Lomborg's paper but based on Nordhaus's model, the graph doesn't even extend to 1.5 degrees. That is because Nordhaus' model simply doesn't appear to be able to implement this. The costs literally shoot up off the page.

In his Nobel speech, Nordhaus also gave an impression of how much CO_2 tax would need to be paid in the course of this century that fits the optimal path. It starts at $36 per tonne of CO_2 in 2015 and will increase to about $150 per tonne of CO_2 in 50 years, which equates to 36 cents per litre of petrol.

It is clear that the work of Nobel Prize winner Nordhaus and also that of Lomborg does not fit in the vein of the EU's ambitious climate plans. The EU is venturing into ambitions – staying below 1.5 degrees – of which Nordhaus's model simply says: not feasible. The EU is plunging into terra incognita. It explains why Nordhaus was not a guest at the European Parliament in 2019 but, instead, the young climate activist Greta Thunberg.

Should we do nothing then? Lomborg: "This doesn't mean the EU shouldn't do anything. But the EU does need take a smarter approach. The fundamental problem of climate policy is that the transition to zero emissions is currently still very expensive. This means that wealthy, well-meaning Europeans can afford to do something, but that very little will happen globally."[29]

The cost of doing nothing is enormous, said Timmermans. The cost of doing nothing is much higher, Guterres said.

28 Slide 7 from Nordhaus's Nobel speech
29 https://www.euractiv.com/section/climate-environment/opinion/eu-must-get-smarter-to-lead-on-climate-change/

Both claims are clearly inconsistent with the work of the winner of the Nobel Prize for economics, William Nordhaus. His work simply implies that the cost of doing nothing will be many times lower than the cost of the EU's very ambitious climate policy that seeks to stay below 1.5 degrees.

IT EXPLAINS WHY NORDHAUS WAS NOT A GUEST AT THE EUROPEAN PARLIAMENT IN 2019 BUT, INSTEAD, THE YOUNG CLIMATE ACTIVIST GRETA THUNBERG.

It is a policy that also depends on other major players in the world, particularly China (currently accountable for 28% of global emissions). If those countries do not participate seriously (which is entirely plausible), then all attempts by the EU will be in vain on account of the EU's contribution on a global scale already being too small for such an outcome.

The EU would do well to invite Nordhaus and Lomborg to explain their viewpoints in further detail. EU climate policy economic advisers should either criticise Nordhaus's work or openly acknowledge that the cost of EU climate policy is astronomical.

CLIMATE CHANGE IS NOT THE END OF THE WORLD

At the end of 2020, Joe Biden said the following in a short statement on Twitter[30] about climate change: "[climate change will] threaten... literally, the existence of our planet - if, that is, we don't take global action". A few hours later, a thread followed on Twitter from Michael Shellenberger, president of Environmental Progress, saying No Joe, climate change is not the end of the world.[31]

In 2020, Shellenberger published his book *Apocalypse Never: Why Environmental Alarmism Hurts Us All.*[32] Despite (or perhaps because of) the growing almost hysterical rhetoric of prominent politicians and Hollywood stars about climate change, Shellenberger and Lomborg (False Alarm), through their books, represent a different emerging trend, that of climate realism and pragmatism.

Yes, both Lomborg and Shellenberger argue, climate change is a real problem and greenhouse gases do play a role. But let's not get ahead of ourselves. There are also all kinds of positive developments and we have to keep them in view.

In his response to Biden, Shellenberger calls it total nonsense that the planet's future is literally at stake. There aren't even enough fossil fuels to make the Earth a kind of Venus (the atmosphere of Venus is made up mostly of carbon dioxide and the average temperature is 462 degrees Celsius).

Biden also stated that, without action, storms will get worse. That isn't correct either, says Shellenberger. Storm casualties have fallen by 90% over the past century and all serious scientific reviews state that this number will continue to decline in the future.

Lomborg shows the figure below in his 2020 paper. The number of victims of climate-related disasters (hurricanes, tornadoes, drought, forest fires, extreme temperatures) has fallen spectacularly over the past century. A hundred years ago, a few million people died every year from natural disasters, but now those numbers are orders of magnitude smaller.

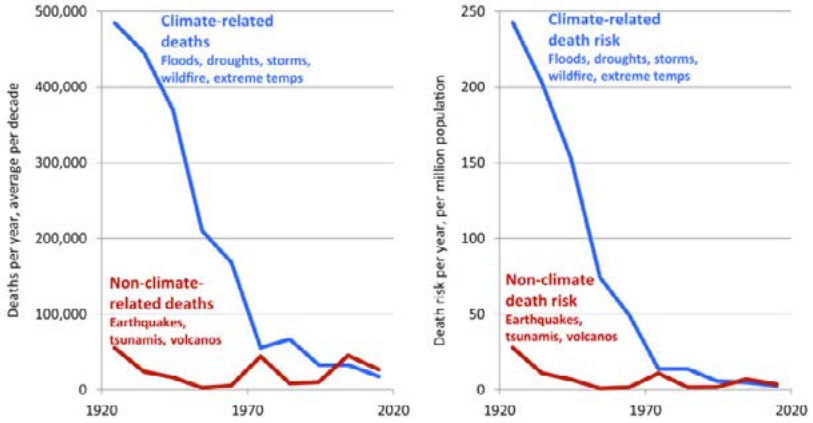

Fig. 14: Casualties as a result of disasters. The numbers are the average per decade. A decrease of more than 90% in the past hundred years in both absolute and relative terms. Source: Lomborg (2020).

30 https://twitter.com/JoeBiden/status/1343939833765519361
31 https://twitter.com/ShellenbergerMD/status/1344015403882692610
32 https://www.amazon.com/Apocalypse-Never-Environmental-Alarmism-Hurts/dp/0063001691

Have you heard of Cyclone Fani? Probably not. This hurricane hit the Indian state of Odisha in May 2019. It was a hurricane of the severest category with wind speeds of around 200 km/h. Odisha is a relatively poor state where 40 million people live. A week after the devastating hurricane swept the area, the death toll was 41. Tragic, of course, but this number is nothing compared to the 10,000 victims that died in the same area in 1999 when one of the worst hurricanes of the 20th century passed through.

This time the Indian government was much better prepared. Meteorologists are better able to predict the hurricane's path. More than a million people had been evacuated. Hundreds of shelters that can handle wind speeds of up to 300 km/h have been built along the coastline since 1999. The entire population had been given instructions. These were simple guidelines, like make sure your phone is charged, make sure you have enough drinking water at home, switch off electricity and gas. After the storm: stay away from damaged power cables, do not enter damaged buildings.

The spectacular decrease in the number of victims as a result of cyclone Fani fits in with the picture that we have seen worldwide since 1900. The number of casualties declined steadily from the 1920s and has since declined by more than 95% in both absolute and relative terms. This applies to all natural disasters, including those that are difficult to predict, such as earthquakes.

This is, of course, very good news. But as we know, good news isn't usually headline news for the media. This is partly logical. Had Cyclone Fani resulted in a disaster of 10,000 dead, it would have been in the news for days and international relief efforts would have started. Now we can – rightfully – move on to the order of the day.

But let's not tell ourselves that things are getting worse. That's simply not true. Yet in our zeal to draw attention to climate change, this is precisely what we tend to do. Also the EU.

For example, the EU wrote in the comprehensive analysis "A Clean Planet for All" from 2018: *"Climate change is already occurring and its impacts are already being felt across Europe: our continent has warmed and will warm faster than the rest of the world. The EU has experienced heatwaves, record temperatures and drought during the spring and summer of 2018 and also experienced extreme heatwaves in 2014, 2015 and 2017. In Lapland, in the Arctic Circle, the average temperature for July was around five degrees Celsius higher than usual. Last year, the global economic costs of weather-related disasters hit a record of €283 billion."*[33]

Listings like this are biased at best and misleading at worst. After all, extreme weather events are timeless occurrences. The Arctic region also went through a period of considerable warming in the early twentieth century. Drought is not only related to weather, but also to land use.

And the statement about record costs from weather-related disasters is downright misleading. Yes, the total cost of disasters does increase over time, but that is mainly because there are more and more people who also possess ever greater capital. Once corrections are made for this, there is no clear trend in costs worldwide and, if there is one, it is a downward trend.[34]

33 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773
34 https://www.forbes.com/sites/rogerpielke/2019/10/31/surprising-good-news-on-the-economic-costs-of-disasters/?sh=2758998a1952

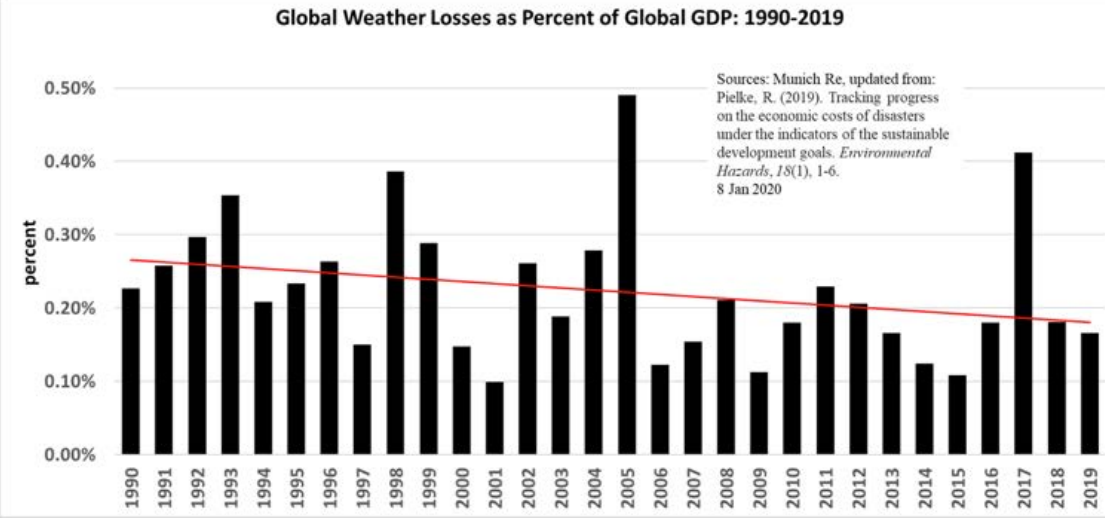

Fig. 15: Extreme weather damage as a percentage of GDP. Source: Roger Pielke Jr

Roger Pielke Jr has multiple scientific publications to his name on this data and he is also a well-known researcher in IPCC circles. This data is rock solid, so the claim that 2017 was a record year is not only incorrect, it is misleading. As can be seen on the graph, it was certainly a year of heavy damage, but not exceptional from a historical perspective.

IT IS UNLIKELY THAT AN INCREASINGLY WEALTHY WORLD POPULATION WILL SUDDENLY SUFFER MORE FROM DISASTERS AS A RESULT OF EXTREME WEATHER IN THE FUTURE.

What remains in terms of climate alarm if we take a very coolheaded look at the data from the past? Frankly, not much. Yes, it has become warmer and CO_2 and other greenhouse gases probably play a major role. But no, most extremes such as hurricanes, tornadoes, floods and droughts have not gotten worse and, thanks to increased prosperity and technological progress, we as humans are also much more resistant to these kinds of extremes. Hence the spectacular drop in casualties. It is unlikely that an increasingly wealthy world population will suddenly suffer more from disasters as a result of extreme weather in the future.

Are other global effects to be expected? Yes, rising sea levels in particular. However, this rise started around 1850 and has been very gradual ever since. No acceleration in the rise of sea level can be observed after 1950 when greenhouse gas emissions begin to take on really serious proportions. It is entirely unclear why sea levels started to rise as early as 1850, or why there was no acceleration after 1950.

There is continuous talk in the public debate of sea levels rising by metres, but this is far from being the case for the time being. Do you know how much sea levels have risen on average worldwide in the past hundred years? Well, …. about twenty centimetres. By way of illustration, here is the average of six stations along the Dutch coast:

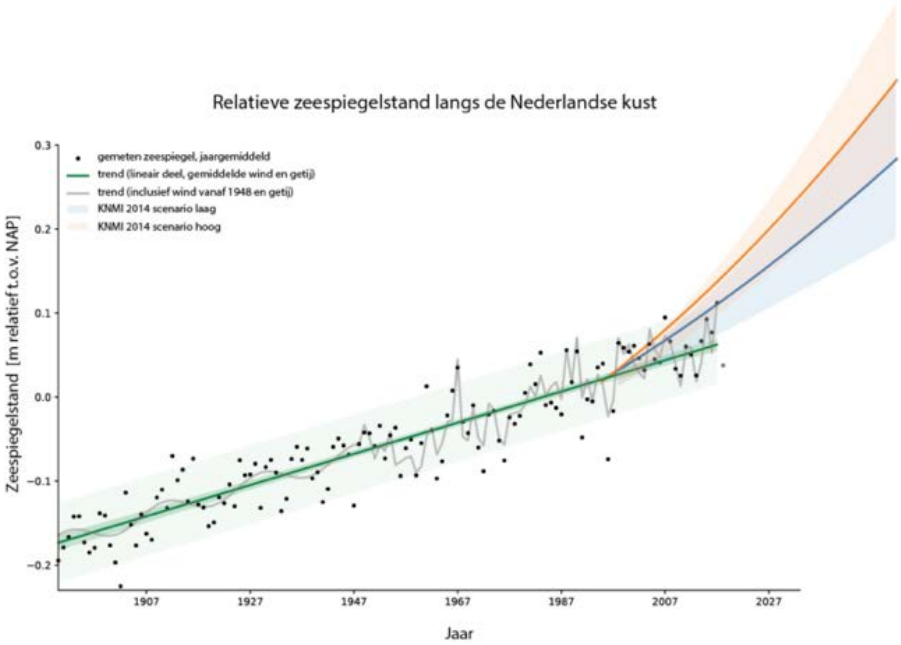

Fig. 16: Sea level rise along the Dutch coast. Source: Deltares[35]

It is striking how linearly the sea level has risen; you can line your ruler along it. The orange and blue lines in Fig. 16 come from the two KNMI[36] scenarios from 2014. It is clearly visible that both scenarios already deviate from reality.

Which brings us to the next point. Much of the threat from climate change lies in the future. And although the future, especially when it comes to a complex system such as the climate, is of course unpredictable by definition, many scientists and policy-makers still think they are fairly certain what will happen in the future. This is due to the very prominent role that computer models have come to play, not only in the climate change debate, but also for all kinds of important issues (such as the role of economic models, but also the epidemiological models used to estimate the number of victims of the COVID-19 pandemic).

An almost sacred trust in climate models has developed in the climate debate and the IPCC reports also rely heavily on these models. These models are supposed to "prove" that greenhouse gases are the cause of global warming and they also calculate what will happen in the future, depending on the scenario that the world will follow. In turn, the output of the climate models is used directly and indirectly as input for impact models that map the consequences of climate change for agriculture, nature and the economy. And the same models are also used to calculate how much CO_2 we as a world are still allowed to emit before exceeding a certain limit and, as such, are also the pillars on which EU climate policy rests.

However, models are only as good as the assumptions fed into them, and since we are dealing with an extremely complex, chaotic system, it is unlikely that models can even approximate reality. For this reason, the validity of the models is the most discussed issue in the climate debate.

Climate sceptics are not so much saying that climate change is completely natural or that the sun plays a much more important role than CO_2, as pointing out that too much confidence is placed in the models and that the future expectations of those models should be taken with a (large) grain of salt. A key point of contention is the so-called climate sensitivity of the models. The critics argue that climate models are hypersensitive, in that they react too strongly to an increase in CO_2. Or, rather, more strongly than the actual climate. An extensive discussion of this debate requires a separate essay, but below is an illustration to give an impression of that discussion:

35 https://www.deltares.nl/nl/nieuws/nauwkeuriger-inzicht-huidige-zeespiegel-langs-de-nederlandse-kust/
36 Royal Dutch Meteorological Institute

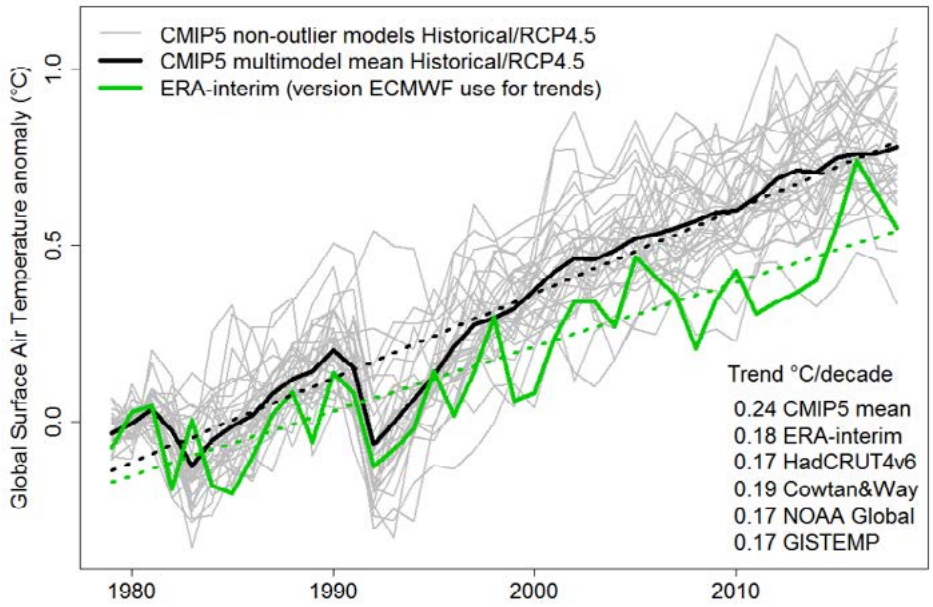

Fig. 17: Climate models as used by the IPCC compared to the world mean temperature from 1979-2018 Source: Nicholas Lewis [37]

The figure shows that climate models have not been able to properly simulate the past forty years. The models generate about 30% more warming than measured. That presents food for thought, because when the modellers ran their models (around 2010) they were of course already familiar with the measurements between 1979 and 2010, and of course the researchers try to reproduce this global average temperature (which is used for the 1.5 and 2 degrees target) as well as they can.

British researcher Nicholas Lewis created this graph for a presentation he gave in Amsterdam in 2019. Lewis is known for his scientific publications on climate sensitivity. In those publications, he shows that the "real" climate, as it has developed since 1850, appears to be considerably less sensitive to greenhouse gases than the climate models imply.[38]

THE "REAL" CLIMATE, AS IT HAS DEVELOPED SINCE 1850, APPEARS TO BE CONSIDERABLY LESS SENSITIVE TO GREENHOUSE GASES THAN THE CLIMATE MODELS IMPLY

It is important to note that Lewis uses all of the IPCC's own assumptions about what happened between 1850 and now in these estimates for climate sensitivity. The IPCC assumes that almost all warming since 1850 has been caused by greenhouse gases, as does Lewis. He therefore links the warming of land and oceans to that increase in greenhouse gases and deduces from this how "sensitive" the climate (in that period) was to those greenhouse gases. These estimates – largely empirical on account of being based on measurements – are much lower than estimates based on climate models.

This discussion about climate sensitivity is crucial because a lower degree of climate sensitivity means that we can expect less warming in the future than the models suggest.

Lewis estimates that RCP6.0, the IPCC's second highest scenario, will lead to about two degrees of warming by 2100. The IPCC itself, based on these climate models, assumes that this scenario will generate a temperature rise of 3 degrees Celsius.

37 Slide 21 of this lecture given by British researcher Nic Lewis in Amsterdam in 2019: https://groene-rekenkamer.nl/wp-content/uploads/2019/04/Ontgroeningsdag-Lewis_slidesnotes.pdf

38 The most relevant paper in this regard is by Nicholas Lewis and Judith Curry, 2018: The impact of recent forcing and ocean heat uptake data on estimates of climate sensitivity. Journal of Climate; https://journals.ametsoc.org/view/journals/clim/31/15/jcli-d-17-0667.1.xml

Which CO_2 emissions "belong" to this RCP6.0 scenario?

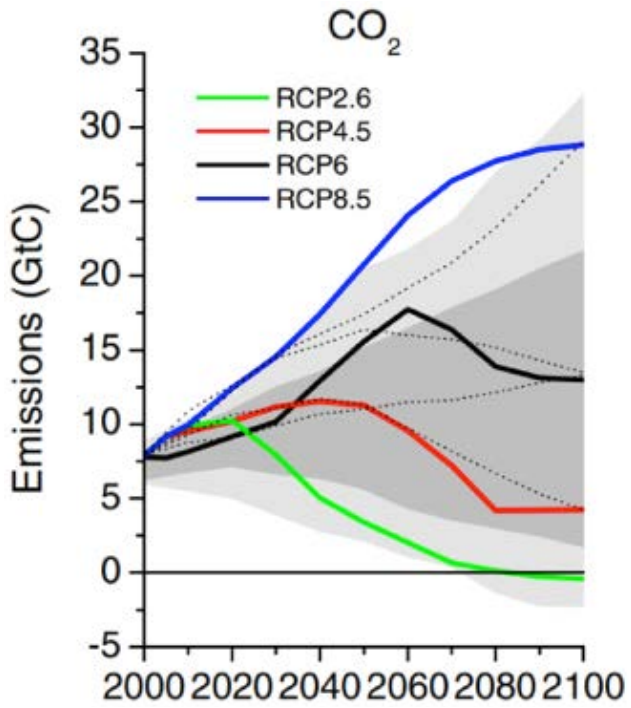

Fig. 18: CO_2-emissions (in gigatonnes of carbon) associated with the different IPCC scenarios. Source: Van Vuuren et al (2011)

Fig. 18 shows that emissions from RCP6.0 will not decrease at all this century! First, emissions will continue to rise until 2060 and then, although they will start to fall, in 2100 emissions will still be higher than in 2020.

This discussion on climate sensitivity is therefore essential as it can make the difference between proceeding towards zero CO_2 now or having another century to do so.

However, the IPCC does not seem eager to admit that the climate may turn out to be considerably less sensitive than the models suggest. A very extensive review paper with several IPCC authors on board recently appeared, which downplayed the low, but measurement-based estimates of Lewis and other researchers.[39] In fact, this review even suggests that such low values are very unlikely. This is a controversial discussion that deserves more attention in the coming years, also from policy-makers.

To recap: the EU wants, based on calculations made with climate models, to become net zero-carbon by 2050 because it wants to try at all costs to stay below 1.5 degrees global warming. To achieve this, however, the EU – which currently accounts for about 10% of global emissions – is highly dependent on other leading economies in the world. Major players who are still busy achieving the same level of prosperity as us and who, like us, see how important affordable energy is in order to get there.

Moreover, economists – including Nobel Prize winner William Nordhaus – argue that trying to stay below 2 or even below 1.5 degrees is much more expensive than accepting a reasonable degree of warming and therefore pursuing a less drastic climate policy. Nordhaus asserts that the economic optimum is even achievable at a warming rate of 3.5 degrees Celsius in 2100.

Meanwhile, there are strong indications that the climate models on which the entire policy is based are "hypersensitive". Future warming will thus be considerably lower than indicated by the IPCC scenarios. A far lower CO_2 reduction is needed to stay below 2 degrees. In fact, emissions throughout the century could be even higher than in 2020 and the 2 degrees specified in the Paris Climate Agreement would still remain in sight. But these relatively new insights are largely disregarded by policy-makers because the IPCC itself continues to rely on the future projections with

39 https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019RG000678

climate models and pays hardly any attention to the reports that the models it uses are likely to be hypersensitive.

The EU also prefers to implement this radical policy with sustainable energy, which has far-reaching consequences not only in financial terms, but also for the landscape and nature.

In recent years, it has also become clear that the most severe IPCC scenario, the RCP8.5 scenario (see Fig. 18), is far from realistic. This scenario was long regarded as a business-as-usual scenario, or a reference or baseline scenario. Or loosely translated: a scenario of laissez-faire, of doing nothing (about climate policy).

So when politicians talk about the costs and consequences of doing nothing, they almost always refer to studies based on this RCP8.5 scenario.[40]

However, this RCP8.5 scenario, several researchers now argue, is completely unrealistic and therefore not to be regarded so much as business as usual but much more as a worst-case scenario. This makes it even more unlikely that the cost of doing nothing will be much higher than the cost of strict climate policy.

There are several reasons why RCP8.5 is unrealistic and this discussion also deserves a separate essay but, very briefly, the reason is that global economic growth is lagging behind expectations arising from this scenario and also that RCP8.5 assumes an unrealistically high increase in the use of coal.

40 See, for example, this EU document that answers the question "What if we do nothing?": https://ec.europa.eu/commission/presscorner/detail/nl/fs_19_6715

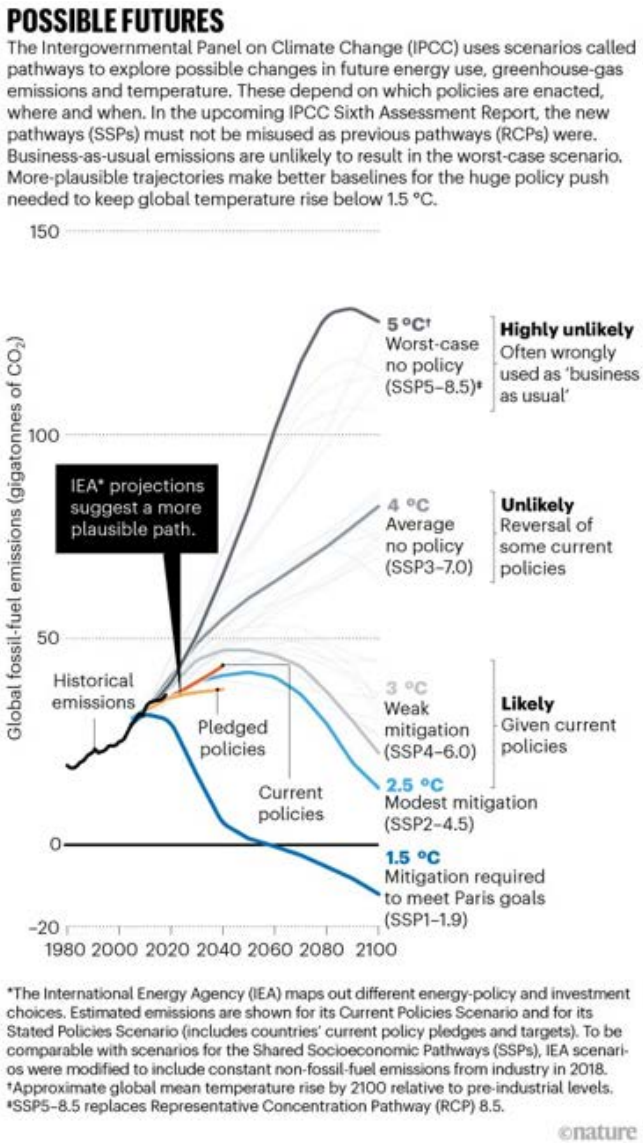

Fig. 19: Global emissions as a result of the use of fossil fuels with various scenarios from the IPCC. The higher scenarios are unlikely. SSP5-8.5 is comparable to RCP8.5[41]

This discussion surrounding the RCP scenarios is also very important, but has actually only just started. The IPCC has almost completed its sixth assessment report, relying hugely on literature that makes use of the high but now regarded as very unlikely RCP8.5 scenario. The IPCC will not be eager to admit now that this scenario is extremely unlikely, because this will not benefit the image of its report.

Lower baseline scenarios in combination with lower climate sensitivity are extremely good news. It means that the two-degree limit remains within reach even without additional climate policy and it also means that any future damage from climate change will be considerably less.

It also provides fascinating new insights into the "costs" of climate change. Canadian economist Ross McKitrick, well known in climate circles, published a paper last year in which the lower estimates for climate sensitivity were calculated into what economists call the Social Cost of Carbon (SCC).[42] This SCC provides an estimate of the damage caused by the emission of an extra tonne of CO_2 and thus determines the amount of a possible CO_2 tax, which must, after all, compensate for such damage.

Earlier in Nordhaus's work (which is based on the IPCC's standard climate models), we discussed

41 https://www.nature.com/articles/d41586-020-00177-3

42 Dayaratna, K.D., McKitrick, R. & Michaels, P.J. Climate sensitivity, agricultural productivity and the social cost of carbon in FUND. Environ Econ Policy Stud 22, 433–448 (2020). https://doi.org/10.1007/s10018-020-00263-w

values of $36 per tonne of CO_2 in 2015, rising to about $150 per tonne of CO_2 in 2050. The latter amounts to 36 cents per litre of petrol.

When the lower estimates for climate sensitivity are included by McKitrick and also the beneficial effects of CO_2 on agriculture, the Social Cost of Carbon then drops to values of just a few dollars per tonne of CO_2 and, at a higher discount rate,[43] even to negative values, which means that the extra CO_2 does not generate any damage but, rather, net benefits for society![44]

Again, in all of the reflections in this essay, we have actually proceeded from the generally accepted assumption that all warming since 1850 has been almost entirely caused by greenhouse gases. This is generally seen as a catastrophe and the EU has even declared it a climate emergency by a large majority. [45]

"AT A HIGHER DISCOUNT RATE THE SOCIAL COST OF CARBON DROPS EVEN TO NEGATIVE VALUES, WHICH MEANS THAT THE EXTRA CO2 DOES NOT GENERATE ANY DAMAGE BUT, RATHER, NET BENEFITS FOR SOCIETY!"

However, a sober look at the facts and measurements that have been collected in relation to the climate over the past 150 years do not confirm this image of a climate crisis. In fact, the insights of recent years reinforce the opposite image: that, partly thanks to increased prosperity, humans are more equipped than ever before to deal with sea level changes and weather extremes, that climate change itself is proceeding much more slowly than expected, that scenarios considered as Business as Usual have proven to be unrealistic and should be seen much more as unlikely worst-case scenarios.

Nevertheless, the political climate train rumbles on and the terrifying propaganda around the issue continues to be stirred up. But something needs to happen for that train to change tracks. The big question is when the railtrack points switch will be pulled for Timmermans' and Von der Leyen's climate train. When citizens find out what havoc the plans will wreak on the landscape? If the costs completely explode?

In Dutch we have the expression "better to turn back half way than get completely lost". However, we often experience how politicians persist in their course to the bitter end. But we also live – thankfully – in a democratic system. It is therefore also up to citizens to indicate via elections whether this climate policy receives support from the population and whether there is support for the "solutions" chosen, i.e. solar, wind and biomass.

In any case, the message of this essay was that we are in no hurry and that panic is unwarranted. Climate change always deserves our attention, but the idea that we need to turn our energy supply upside down right now seems mainly an emotional decision.

Marcel Crok

Amsterdam, April 2021

43 Https://www.rwseconomie.nl/discontovoet#:~:text=De%20discontovoet%20is%20een%20percentage,het%20basisjaar%20van%20het%20project

44 Dayaratna, K.D., McKitrick, R. & Michaels, P.J. Climate sensitivity, agricultural productivity and the social cost of carbon in FUND. Environ Econ Policy Stud 22, 433–448 (2020). https://doi.org/10.1007/s10018-020-00263-w

45 https://www.europarl.europa.eu/news/nl/press-room/20191121IPR67110/europees-parlement-roept-klimaatnoodtoestand-uit

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