The Hague Court of Appeal
Case number: 200.302.332
Cause-list date: 19 March 2024

PAULUSSEN ADVOCATEN

WRITTEN ARGUMENTS

in the matter of:

1. **Vereniging Milieudefensie**
   having its registered office in Amsterdam, the Netherlands;
2. **Stichting Greenpeace Nederland**
   having its registered office in Amsterdam, the Netherlands;
3. **Landelijke Vereniging tot Behoud van de Waddenzee**
   having its registered office in Harlingen, the Netherlands
4. **Stichting ter bevordering van de Fossielvrij-beweging**
   having its registered office in Amsterdam, the Netherlands;
5. **Stichting Both ENDS**
   having its registered office in Amsterdam, the Netherlands;
6. **Jongeren Milieu Actief***
   having its registered office in Amsterdam, the Netherlands;

Respondents, original claimants,

Collectively called: "**Milieudefensie et al./Friends of the Earth Netherlands et al.**" (hereinafter: Milieudefensie et al.)

Legal counsel:
mr. R.H.J Cox, *mr.* M.J. Reij, *mr.* A.J.M. van Diem

versus:

Shell plc
having its registered office in London, United Kingdom

Appellant, originally the defendant

Legal counsel:
mr. D.F. Lunsingh Scheurleer, *mr.* T. Drenth

and:

Stichting Milieu en Mens

* Vereniging Jongeren Milieu Actief, the youth organisation of Vereniging Milieudefensie, was dissolved as of 1 September 2022. Its activities have continued within Milieudefensie.

having its registered office in Zwolle, the Netherlands

Joined party on the part of Shell plc

Legal counsel:
mr. Dr D.J.B. Bosscher

Contents

1. Introduction

"*Human-caused climate change is already affecting many weather and climate extremes in every region across the globe. This has led to widespread adverse impacts on food and water security, human health and on economies and society and related losses and damages to nature and people (high confidence).*"[1]

1. These words from the last Synthesis Report of the IPCC make it painfully clear that the consequences of climate change can be seen and felt everywhere in the world today, including in the Netherlands. In the past few years unprecedented weather and climate extremes have occurred on every continent, with drastic consequences. Climate change is already leading to enormous and increasingly often irreversible losses, as well as to future danger that almost exceed a person's ability to comprehend.

2. Every fraction of further warming causes an increase of the tangible and intangible damage and an increase in climate-related risks.[2] In addition, it makes these risks more difficult to manage – and at some point simply unmanageable – and it limits the possibilities for adaptation and sustainable development.[3] When taking all this into account sight must not be lost of the fact that the climate system has a delayed response to greenhouse gas emissions.[4] In other words, the CO_2 that has been emitted up to now is causing damage to the world and to the Netherlands, which is much greater than can be currently observed. Some consequences of the increased CO_2 concentration in the atmosphere will persist for many tens of years and even many hundreds to thousands of years, such as the melting of ice masses (glaciers and ice caps), the thawing of permafrost, the warming of the oceans and the rising sea levels that are the result of the warming of the water and the melting of, inter alia, the Greenland and Antarctic ice caps. This means that the consequences that we see to this day, only provide a glimpse of what awaits the world, no matter what. This is particularly the case because more than 40% of the total quantity of greenhouse gases was emitted after 1990[5] and because it is unavoidable that until the time that global CO_2 emissions are reduced to net zero, additional CO_2 will still be emitted. All of this means that the actions of today dictate the future that the world and the Netherlands are facing. A part of that changing future is already fixed in the increased CO_2 concentration in the atmosphere. But the very worst consequences can still be avoided. It is clear that the limiting of further risks stands or falls with the limiting of the total quantity of emissions (the cumulative CO_2 emissions) on the road to that global zero point.[6]

3. The above shows the urgency of fast, far-reaching and permanent emission reductions to limit global warming to 1.5°C. The above also shows that every effort must be taken to not exceed the danger limit of 1.5°C – not even temporarily.[7]

4. The urgency of the fastest possible action is again underscored by the latest insights from science about tipping points in the climate system that can put abrupt and/or irreversible processes in motion that further uncontrollably worsen the climate problem. "*There is indisputable evidence that the planet is approaching tipping points*", according to the OECD in a recent report based on

[1] Exhibit MD-495A, IPCC, 2023: Climate Change 2023: Synthesis Report, p. 42.
[2] Ibid, pp. 69, 70, 71, 72, 75, 88, 89, 95 and Figure 4.2 on p. 97.
[3] Ibid, pp. 72, 88, 89, 95 and Figure 4.2 on p. 97.
[4] See also Judgment, para. 2.3.2.
[5] Exhibit MD-495A, IPCC, 2023: Climate Change 2023: Synthesis Report, p. 44. This is based on data up to and including 2019.
[6] The District Court has also explicitly recognised that the total quantity of emissions must remain within the still available carbon budget, in e.g. paras. 2.3.4, 4.4.26 to 4.4.28. Shell acknowledges this too.
[7] With the term danger limit Milieudefensie et al. is referring to the 1.5°C limit defined by the global community. It is evident that at this moment too – with an average warming of approx. 1.2°C – there are already great dangers, as is confirmed in further detail in these written arguments.

scientific insight.[8] "*Some Earth System tipping points are no longer high-impact, low-likelihood events, they are rapidly becoming high-impact, high-likelihood events*", cited from the Global Tipping Points Report 2023, a sizeable scientific research report into tipping points that was published during COP28 on 6 December 2023, and which involves more than 200 authors and 25 institutes (the "**GTP report**").[9]

5. The GTP report shows that it cannot be ruled out that five tipping points may be passed with the current warming of 1.2°C, of which the mass dying off of tropical coral reefs is already likely now. The four other tipping points are: the melting of the Greenland and West Antarctic ice caps, the collapse of the Subpolar Gyre (a circular ocean current at the ocean's surface) and the abrupt thawing of parts of permafrost.[10] Other research shows that the passing of the "*point of no return*" with regard to the West Antarctic ice cap, the glaciers of which contain enough ice for the sea level to rise by over 5 metres, might already be unavoidable even if the warming remains limited to 1.5°C.[11] According to the GTP report, above the limit of 1.5°C three more tipping points will become vulnerable, and as of 2°C various tipping points will be added. In view of the fact that natural systems are closely connected with each other, passing a tipping point in one system can, moreover, have significant consequences for the stability of other systems: "*Global warming is rapidly approaching levels that could trigger individual tipping points in systems that can interact with and destabilise other tipping systems.*"[12]

6. As agreed, Milieudefensie et al. will use these written arguments to discuss relevant new developments. Milieudefensie et al. will primarily focus on two subjects. Firstly, the recent developments in climate science. The almost unimaginable severity and threat posed by the climate problem is obviously important when determining Shell's duty of care. According to the criteria established in the *Kelderluik* case, this duty of care must be weighed taking account of the severity and extent of the danger. The measures to be expected of Shell must therefore be proportional in relation to the severity and the extent of the expected risks, damage and violation of rights. The greater and more severe the danger in question, the greater the duty of care. But also: the greater and more severe the danger, the less quickly a far-reaching duty of care will be deemed unreasonably onerous. The dangers of climate change for humans and the environment therefore form the factual basis for this lawsuit and form the background against which the grounds for appeal of Shell and M&M against the Judgment must be assessed.

7. Secondly, Milieudefensie et al. will focus on Shell's conduct and the developments in Shell's strategy since the submission of the statement of defence on appeal in October 2022. This will show, inter alia, that Shell actually took advantage of a fossil fuel energy crisis to continue to hold on to its fossil fuel business model, to water down its ambitions for sustainable energy and to manoeuvre the world into a further fossil fuel lock-in with intended investments in new oil and gas fields and other fossil fuel infrastructure. In its own words, Shell is "*Committed to oil and gas, with a focus on LNG growth*".[13] Between 2023 and 2030 Shell intends to invest more than USD 100 billion in existing and new oil gas activities.[14]

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[8] Exhibit MD-507, OECD (2022), Climate Tipping Points: Insights for Effective Policy Action, p. 3.

[9] Exhibit MD-574B, Lenton et al., The Global Tipping Points Report 2023. University of Exeter, Exeter, UK, pp. 10 and 20.

[10] Ibid, pp. 20: "*Already, at today's 1.2°C global warming, tipping of warm-water coral reefs is likely and we cannot rule out that four other systems may pass tipping points: the ice sheets of Greenland and West Antarctica, the North Atlantics Subpolar Gyre circulation, and parts of the permafrost subject to abrupt thaw.*"

[11] Exhibit MD-499A, Naughten et al. in Nature Climate Change (2023), 'Unavoidable future increase in West Antarctic ice-shelf melting over the twenty-first century', p. 1. See also Exhibit MD-506, International Cryosphere Climate Initiative, State of the Cryosphere 2023, pp. 9 and 11.

[12] Exhibit MD-574B, p. 20.

[13] Exhibit MD-536A, p. 9.

[14] See below in section 3.3.

8. Science and the international political consensus as presented in the last COP decisions under the Paris Agreement leave no room for doubt that we are at a critical point and that the steps that are taken today and tomorrow will be all-decisive for the life of current and future generations and all other life on Earth. Although some future consequences can no longer be prevented, we are still able to limit the greatest dangers and risks of climate change as much as possible.

9. With its acts and failures to act, for decades Shell has intentionally and purposefully been standing in the way of the needed positive transformation. With its substantial investments in oil and gas and its unprecedented influence on the political and societal debate, Shell is frustrating achieving the global climate goals, as well as the political and societal supporting base for the required climate action.

10. If it is up to Shell (and M&M), this appeal will particularly speak of the complexity of the energy transition and the possible hurdles that might arise in this transition. Shell also frequently refers to scenarios to argue on the basis thereof that all kinds of energy-consuming sectors need not or cannot move that fast and that when looking at energy suppliers, it is the coal sector that must move first. Shell also refers to the importance of energy security and the affordability of energy - as if its 'commitment to oil and gas' would provide this - and Shell believes that we particularly have to wait until governments and customers change. Milieudefensie et al. has already extensively discussed all these arguments, which will be discussed further during the oral arguments. At this point Milieudefensie et al. would like to make the following remarks in this respect.

11. Contrary to how Shell (and M&M) present the matter, the choice the world is facing today explicitly does not consist of either a scenario of accelerated climate action in line with the Paris Agreement or a scenario in which the sustainable energy transition simply takes place somewhat more slowly, without this involving further consequences for society. Opting for the last scenario is opting for a scenario in which climate change will drastically change our living environment and society, according to the GTP report as well:

    "*The existence of tipping points means that 'business as usual' is now over. Rapid changes to nature and society are occurring, and more are coming. If we don't revise our governance approach, these changes could overwhelm societies as the natural world rapidly comes apart.*"[15]

12. It is crystal clear that we either transform quickly and drastically and do everything possible today to accelerate the climate approach and related sustainable energy transition, or keep pointing to each other and more or less continue on the current footing, with significant and possibly even catastrophic consequences as tipping points in the climate system are reached as discussed above (referred to as ESTPs (Earth System Tipping Points) in the following quotation):

    "*Human civilisation will fundamentally change in the coming decades. The only question is, will that change be collectively chosen by humanity in ways that maximise our wellbeing? Or will it be chosen for us, with potentially catastrophic consequences, if we continue to ignore biophysical limits and the risks of ESTPs? It is within our collective abilities to deliver a prosperous, climate-resilient future for all. But we require different priorities and strategies to those on which we previously relied.*"[16]

13. An accelerated climate approach and related transformation is therefore necessary to secure our collective future. As evidenced by the UN Climate Convention, the Paris Agreement, the COP decisions with the Paris Agreement and the Sustainable Development Goals, the entire global community agrees on this. What is more, the stress test of the European Central Bank (ECB)

[15] Exhibit MD-574B, The Global Tipping Points Report 2023, p. 10.
[16] Exhibit MD-574B, p. 285.

confirms that an accelerated energy transition is economically cheaper, less disruptive and less risky than any other form of postponement.[17]

2. Update on climate science

2.1 Introduction

14. In March 2023 the IPCC published its most recent report: the Synthesis Report ("**AR6 SYR**").[18] This is the last product of the Sixth Assessment Report and provides a summary of the state of knowledge about climate change, the consequences and risks thereof, and the mitigation and adaptation options, based on peer-reviewed scientific, technical and socio-economic literature since the publication of AR5 in 2014. AR6 SYR contains the synthesis of the most important findings of the contributions of the three working groups: WGI, WGII and WGIII and the three *Special Reports* that have been published since 2014.

15. This update on climate science will discuss a number of important findings of AR6 SYR. In addition, more recent findings from science and other relevant developments will be discussed. AR6 SYR relates to the scientific literature up to 31 January 2021 (for WGI), 1 September 2021 (WGII) and 11 October 2021 (WGIII).[19] This literature must already have been peer reviewed and accepted for publication before the submission deadline. About 2.5 to 3 years have passed since that deadline.[20]

2.2 Warming to date and the delay in the climate system

16. According to AR6 SYR, the average surface temperature on Earth in the period 2011-2020 had risen by 1.1°C relative to the average pre-industrial temperature (1850-1900).[21] The latest estimate is that this has in the meantime increased to 1.2°C.[22] The average CO_2 concentration had increased in 2022 to over 417 ppm.[23] By way of comparison: in the past 800,000 years, the CO_2 concentration fluctuated between 180 ppm (ice ages) and 300 ppm (warm periods).[24]

17. The year 2023 was by far the warmest year since measurements began 174 years ago.[25] The eight preceding years - the years 2015 to 2022 - all fall among the warmest years ever measured.[26]

18. In February 2024 it became clear that the global temperature had exceeded 1.5°C for twelve consecutive months for the first time.[27] Exceeding the temperature limit for a period of twelve months does not mean, however, that the average warming has exceeded 1.5°C (as mentioned, average warming is 1.2°C). Because annual figures show peaks and troughs, a long-term average is used to estimate average warming. It is concerning, however. According to the best estimate the 1.5°C warming may be reached in 2034.[28] This is 11 years earlier than thought when the Paris

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[17] Exhibit MD-531A, ECB 6 September 2023, 'Faster green transition would benefit firms, households and banks, ECB economy-wide climate stress test finds', pp. 1-3.
[18] Exhibit MD-495A.
[19] Exhibit MD-495A, p. 3, footnote 1. The Special Reports relate to scientific literature that had been accepted for publication on 15 May 2018, 7 April 2019 and 15 May 2019 respectively.
[20] See Summons, Section V.5 about the IPCC's working method when drawing up reports.
[21] Exhibit MD-495A, p. 42: "*Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850–1900 in 2011–2020.*"
[22] Exhibit MD-574B, The Global Tipping Points Report 2023, p. 20. See also Exhibit MD-498A, KNMI'23 Climate Scenarios for the Netherlands: Abstract, p. 1.
[23] Exhibit MD-518, p. 2315 and Exhibit MD-523, p. 5.
[24] Summons, para. 324.
[25] Exhibit MD-575A, Press release of the World Meteorological Organization 12 January 2024, 'WMO confirms that 2023 smashes global temperature record'. See also Exhibit MD-575B, NRC 18 January 2024, 'Dit zijn de extremen van 2023, het warmste jaar sinds mensenheugenis', ['These are the extremes of 2023, the warmest year in human memory'], p. 1.
[26] Exhibit MD-505B, State of the Global Climate 2022, p. 3.
[27] Exhibit MD-575D, BBC, 8 February 2024, 'World's first year-long breach of key 1.5C warming limit', pp. 1 to 4.
[28] Exhibit MD-575E, Copernicus Climate Change Service, 12 December 2023, 'We've 'lost' 19 years in the battle against global

Agreement was signed. Because over 8 years have passed since the end of 2015, the world has in essence 'lost' 19 years in the battle against climate change, according to the European Climate Change Service.[29]

19. The emission of greenhouse gases has continued to increase in the past few years, with the exception of a decrease in 2020 during the global pandemic. Global CO_2 emissions now account for more than 40 Gt per year. In 2022, the CO_2 emissions caused by fossil fuels rose to a record high of 38.5 ± 3.08 Gt. The CO_2 emissions in the land sector (LULUCF) are estimated at 3.87 ± 2.71 Gt.[30]

20. Because the climate system has a delayed response to greenhouse gas emissions, the consequences of the ever-increasing emissions are not yet fully noticeable. As mentioned, those consequences will continue for hundreds to thousands of years.[31]

21. The significant risks connected with the emissions to date and the related warming were explained at first instance and determined by the District Court.[32] Since that determination, the risks of further warming have increased, according to the IPCC:

    "For a given level of warming, many climate-related risks are assessed to be higher than in AR5 (high confidence). Levels of risk for all Reasons for Concern (RFCs) are assessed to become high to very high at lower global warming levels compared to what was assessed in AR5 (high confidence). This is based upon recent evidence of observed impacts, improved process understanding, and new knowledge on exposure and vulnerability of human and natural systems, including limits to adaptation. Depending on the level of global warming, the assessed long-term impacts will be up to multiple times higher than currently observed (high confidence) for 127 identified key risks, e.g., in terms of the number of affected people and species. Risks, including cascading risks (see 3.1.3) and risks from overshoot (see 3.3.4), are projected to become increasingly severe with every increment of global warming (very high confidence)"[33] (emphasis added by legal counsel).

22. This increased risk estimate arises from recent observations, improved insight into processes and new knowledge about exposure and vulnerability of human systems and ecosystems, including the limits to adaptation, according to the IPCC. The risks, including 'cascading risks', also known as domino effects, and the risks of (temporary) exceeding of the danger threshold of 1.5°C (overshoot) will continuously become more serious with each fraction of further warming.

23. The disastrous consequences and risks of climate change have, of course, long been known, and form the foundation of international political consensus that the warming of the Earth must remain limited to 1.5°C. The most recent insights show, however, that the consequences of climate change will manifest themselves more quickly and that it will be concluded increasingly often that certain risks are greater than previously thought.[34]

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warming since the Paris Agreement', pp. 1 to 7.

[29] Ibid.

[30] Exhibit MD-523, Emissions Gap Report 2023: Broken record, p. 5.

[31] Exhibit MD-495A, p. 69. See also p. 24 (under C.1.3): *"Continued emissions will further affect all major climate system components, and many changes will be irreversible on centennial to millennial time scales and become larger with increasing global warming."*

[32] See, inter alia, Summons, Section VII. See also Judgment, paras. 2.3.5 to 2.3.9.

[33] Exhibit MD-495A, p. 71. See also p. 24 of the Summary for Policymakers and pp. 46 and 68.

[34] Exhibit MD-347, p. 43: "*Since AR5, climate risks are appearing faster and will get more severe sooner (high confidence). Impacts cascade through natural and human systems, often compounding with the impacts from other human activities.*" See also Exhibit MD-495A, p. 89: "*Observed adverse impacts and related losses and damages, projected risks, trends in vulnerability, and adaptation limits demonstrate that transformation for sustainability and climate resilient development action is more urgent than previously assessed (very high confidence).*" See, e.g., Exhibit MD-506, p. 10 on the melting ice caps: "*continued improvements in numerical modeling and scientific understanding of ice sheet processes shows that the Greenland and Antarctica ice sheets are more sensitive to warming than previously thought, and have the potential to release*

24. In the State of the European Climate 2022 report, the Copernicus Climate Change Service provides insight into the climate conditions and weather extremes in 2022. During the summer months of 2022 heatwaves were plaguing all of Europe and the temperatures rose to 10°C above the average summer temperature. In the United Kingdom, temperatures above 40°C were recorded for the first time. The surface temperature of the ocean reached a record temperature. Extreme marine heatwaves occurred in the Mediterranean Sea.[35] Southern Europe experienced a record number of days with extreme heat stress, glaciers lost record amounts of ice and a large land surface was destroyed by wildfires.[36] The year was drier than average, soil humidity fell to the second lowest level in 50 years, and the river discharge reached the second lowest level.[37] Temperatures rose significantly in the North Pole area, with a heatwave in Greenland in September, and an annual temperature of 3°C warmer than average in north-western Siberia.[38]

25. 2023 saw even more records. As previously mentioned, last year was the warmest year ever measured by far. In 7 months of 2023 the average temperature was the highest ever measured in that month.[39] The surface temperature of the sea water in the North Atlantic Ocean reached a record (again) in 2023.[40] The water in the Mediterranean Sea reached a temperature of 30°C at several locations.[41] The Wadden Sea region reached 21˚C, which is the highest temperature ever measured.[42] Greece was plagued by wildfires and then by storm, extreme rainfall and floods.[43] Heatwaves caused extreme temperatures throughout all of Europe. Just outside of Europe, temperatures in Morocco exceeded 50°C for the first time.

26. Outside of Europe, the picture is just as concerning. Drought, extreme heat, wildfires and flooding had enormous consequences for humans and the environment worldwide.[44] And in 2022, Pakistan and Bangladesh were hit by unimaginable floods. In Pakistan a third of the country was hit by floods and 33 million people were hit by the destruction of many basic facilities.[45] More than 1.5 million homes were destroyed and 18,000 km2 of agriculture land were lost, almost half of the Netherlands. Only one disaster, that caused 30 billion in damage, an enormous sum of money,

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greater and more rapid sea-level rise and at lower global mean temperatures than previously estimated."

[35] Exhibit MD-504, p. 7.

[36] Exhibit MD-504, pp. 8, 10 and 12. See also Exhibit MD-505B, WMO, State of the Global Climate 2022, pp. 24-27.

[37] Exhibit MD-504, pp. 9 and 10.

[38] Exhibit MD-504, pp. 14-16.

[39] Exhibit MD-575B, p. 5.

[40] Exhibit MD-575B, p. 9. See also NOS, 2 July 2023, Sterke opwarming Atlantische Oceaan werpt licht op tekortkomingen meetsysteem [Significant warming of Atlantic Ocean sheds light on shortcomings of the measurement system], available on https://nos.nl/collectie/13871/artikel/2481180-sterke-opwarming-atlantische-oceaan-werpt-licht-op-tekortkomingen-meetsysteem.

[41] The Guardian 21 July 2023, 'Soaring temperatures may signal the decline of summer holidays to the Mediterranean', available on https://www.theguardian.com/travel/2023/jul/21/soaring-temperatures-may-signal-the-decline-of-summer-holidays-to-the-mediterranean.

[42] NOS 3 July 2023, Water Waddenzee nog nooit zo warm: "Gevolgen klimaatverandering spelen zich voor onze ogen af" [Water in the Wadden Sea has never been so warm: "Consequences of climate change are occurring before our eyes"], available on https://nos.nl/regio/friesland/artikel/412922-water-waddenzee-nog-nooit-zo-warm-gevolgen-klimaatverandering-spelen-zich-voor-onze-ogen-af.

[43] NOS 30 September 2023, 'Grootste bos van Europa in brand: 'zonder hulp gaat niemand het redden' ['Biggest forest in Europe on fire: 'no one will make it without help'], available on https://nos.nl/video/2492414-grootste-bos-van-europa-in-brand-zonder-hulp-gaat-niemand-het-redden. See also NOS 24 August 2023, 'Eurocommissaris: natuurbrand in noorden van Griekenland is 'grootste ooit in EU', ['Euro Commissioner: wildfire in northern Greece "biggest ever in EU"'], see https://nos.nl/artikel/2487861-eurocommissaris-natuurbrand-in-noorden-van-griekenland-is-grootste-ooit-in-eu and NOS 5 September 2023, 'Na bosbranden kampt deel van Griekenland nu met overstromingen', ['After forest fires, part of Greece is battling floods'] see https://nos.nl/artikel/2489351-na-bosbranden-kampt-deel-van-griekenland-nu-met-overstromingen.

[44] Exhibit MD-575B, pp. 1 to 21. Exhibit MD-525, pp. 65-66 (Box 2.2).

[45] All of this can be read in reporting on this disaster, see Exhibit MD-575G.

certainly for a developing country.[46] In Bangladesh, 7.2 million people were affected and almost 4 million people were displaced.[47]

27. In the past few years temperatures reached or in some cases exceeded 50°C at many locations around the world, even in the west of Canada.[48] The ocean is warmer than ever and marine heatwaves are occurring increasingly often, with far-reaching consequences for biodiversity and ecosystem services.[49] Water temperatures of 38°C were measured in the ocean water around Florida (as warm as a jacuzzi).[50] The oceans cover 70% of the Earth's surface, take up more than 90% of the extra heat and almost a quarter of CO_2 emissions.[51] This warming causes a decrease in the oxygen level and the absorption of CO_2 causes acidification of the ocean. The warming of the water decreases the ocean's capacity to absorb CO_2. According to the IPCC, both the degree of acidity and the degree in which the acidity level of the ocean water changes is "*unprecedented*" in at least 26,000 years.[52]

28. The glaciers are also melting faster than thought worldwide. A sizeable study based on two decades of satellite data of all 215,000 glaciers worldwide shows that even in the most optimistic scenario in which warming is limited to 1.5°C, approximately half of all glaciers, and 26% of the total volume of glacier ice, will disappear this century.[53] In case of greater warming, the glaciers will melt even more quickly: "*every fraction of a degree of temperature increase substantially affects glacier mass loss.*"[54] The melting of glaciers has potentially far-reaching consequences. For example, glaciers form a critical water source for some 1.9 billion people, the melt water contributes to the rising sea level and the risk of other physical dangers increases, such as the risk of flooding as a result of glacial lakes flooding or glacier ice collapsing.[55]

29. The above can be briefly summarised in the words of the Secretary-General of the World Meteorological Organization: "*Greenhouse gas levels are record high. Global temperatures are record high. Sea level rise is record high. Antarctic sea ice is record low. It's a deafening cacophony of broken records*".[56]

30. The Amazon region is also dealing with the extreme consequences of climate change. Since mid-2023, unprecedented drought has been occurring in a very large part of the region. Little rain is falling, which in itself is rare in a tropical rainforest. At the beginning of 2024 a group of scientists published an international study in which it is concluded that this drought is virtually fully due to

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[46] Ibid.

[47] Exhibit MD-505B, p. 35. See also https://www.aljazeera.com/news/2022/6/22/bangladesh-floods-experts-say-climate-crisis-worsening-situation.

[48] Exhibit MD-505A, p. 24.

[49] Exhibit MD-505A, pp. 10 to 12, Exhibit MD-505B, pp. 4 to 6 and pp. 9-10.

[50] The Guardian 25 July 2023, 'Florida ocean records 'unprecedented' temperatures similar to a hot tub', available on https://www.theguardian.com/us-news/2023/jul/25/florida-ocean-temperatures-hot-tub-extreme-weather.

[51] Exhibit MD-505A, pp. 11 and Exhibit MD-505B, p. 4 to 6.

[52] Exhibit MD-364, TS.2.4, pp. 74 to 76.

[53] Exhibit MD-500A (Rounce et al, Science (2023), 'Global glacier change in the 21st century: Every increase in temperature matters', p. 1 and p. 6: "*Regardless of the temperature change scenario, all regions will experience considerable deglaciation at local scales with roughly half of the world's glaciers by number projected to be lost by 2100, even if temperature increase is limited to +1,5°C*"). See also Exhibit MD-500B, pp. 1-2.

[54] Ibid, pp. 2.

[55] Ibid, pp. 1. See also Exhibit MD-576, 10 new insights in climate science 2023/2024, pp. 31- 32, including on p. 31: "*Glaciers contribute to healthy mountain environments. During dry periods, glacier meltwater is vital for maintaining river flows that support mountain and downstream regions, recharging aquifers, providing freshwater for human consumption and irrigation, and sustaining ecosystems and biodiversity, as well as fisheries and shipping. Additionally, glaciers have considerable spiritual, cultural and touristic value.*"

[56] Exhibit MD-575C, WMO 30 November 2023, 2023 shatters climate records, with major impacts, p. 3.

climate change.[57] The structural drying out of the Amazon forest is deemed a tipping point, because of the irreversible and drastic consequences for biodiversity. The rainforest is also an important part of the global hydrological cycle and the carbon cycle. The passing of a tipping point in the Amazon forest would directly expose 6 million people to extreme heat stress.[58] Based on current estimates, a tipping point could already be reached as of 2°C.[59] More than 75% of the Amazon forest is already showing a loss of resilience compared to 20 years ago and a part of the forest is now a net source of CO_2 emissions.[60]

31. According to the IPCC, at present 3.3 to 3.6 billion people worldwide are living in areas that are very vulnerable to climate change.[61] A recent peer-reviewed study in *Nature Sustainability* concluded that more than 600 million people worldwide are already being exposed to unprecedented heat, with significant consequences for health and the possibilities of working indoors and outdoors. Warming of 2.7 ˚C could result in this number increasing to about one-third of the world's population, including the inhabitants of Aruba and the Netherlands Antilles.[62]

32. The IPCC warns in AR6 SYR that the consequences of climate change that have already been observed and the related damage, the still expected risks and the limitations to adaptation entail that a sustainable transformation will become even more urgent than was previously estimated.[63] It is clear that every day that the required action is not taken, the options for sustainable development will become even more limited worldwide:

    "Climate resilient development pathways have been constrained by past development, emissions and climate change and are progressively constrained by every increment of warming, in particular beyond 1.5°C (very high confidence)."[64]

33. The IPCC emphasises in this respect that the protection of biodiversity and ecosystems is of fundamental importance for a sustainable and climate-proof development. It is precisely biodiversity and ecosystem services that have a limited capacity for adjusting to an increasing warming of the Earth, in particular if the warming exceeds the 1.5°C limit.[65]

34. The importance of intervening as quickly as possible is also emphasised in a recent scientific analysis of the leading medical journal The Lancet about the significant consequences of climate change for human health: "*With 1337 tonnes of CO2 emitted each second, each moment of delay worsens the risks to people's health and survival*."[66]

35. To make matters worse, the already rapidly shrinking 1.5°C carbon budget is even smaller than thought. In June 2023 a group of scientists published an important update about the developments

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[57] Exhibit MD-577C, NOS 31 January 2024, Recorddroogte in het regenwoud: zorgen over toekomst Amazonegebied [Record drought in the rainforest: concerns about the future of the Amazon region], pp.1-5.
[58] Exhibit MD-574B, Global Tipping Points Report 2023, p. 177.
[59] Exhibit MD-574B, Global Tipping Points Report 2023, p. 88, with a bandwidth of 2°C to 6°C. See also Exhibit MD-577A, CNN 14 February 2024, 'The Amazon has survived changes in the climate for 65 million years. Now it's heading for collapse, a study says', pp. 1 to 3 about a more recent study in Nature Climate Change, also with very concerning results (Exhibit MD-577B, pp. 555 and 559).
[60] Exhibit MD-574B, p. 88.
[61] Exhibit MD-495A, p. 51.
[62] Exhibit MD-508, Lenton et al., Nature Sustainability (2023), 'Quantifying the human cost of global warming', pp. 1242-1243 (under Discussion).
[63] Exhibit MD-495A, p. 89: "*Observed adverse impacts and related losses and damages, projected risks, trends in vulnerability, and adaptation limits demonstrate that transformation for sustainability and climate resilient development action is more urgent than previously assessed (very high confidence).*"
[64] Exhibit MD-495A, p. 89.
[65] Exhibit MD-495A, p. 89.
[66] Exhibit MD-521, Romanello M, Di Napoli C, Green C, et al. The 2023 report of the Lancet Countdown on health and climate change: the imperative for a health-centred response in a world facing irreversible harms. Lancet 2023, p. 2.

since publication of AR6 WGI in 2021. A crucial finding is that the best estimate of the remaining carbon budget for a 50% chance of 1.5°C from the start of 2020 is adjusted to 400 Gt (instead of 500 Gt) and as of the beginning of 2023 is only 250 Gt.[67] Based on the current level of CO_2 emissions, this means that as of the beginning of 2023 only 6 ¼ years remain until the carbon budget for 1.5°C has been used up.

2.3 The world is on course for 2.7°C warming

36. A worrisome conclusion against this background is that the existing plans to reduce emissions are still "*highly insufficient*" to close the emissions gap in 2030, according to the UNEP in its annual Emissions Gap Report.[68]

37. According to best UNEP estimates, the implementation of the current global climate policy will lead to a significant overrun of the carbon budget, and a warming of 2.7°C (50% chance). This will even give a chance that the warming will exceed 3.5°C.[69] Urgent action of governments and companies is therefore needed to be able to close the emission gap with the 1.5°C target.

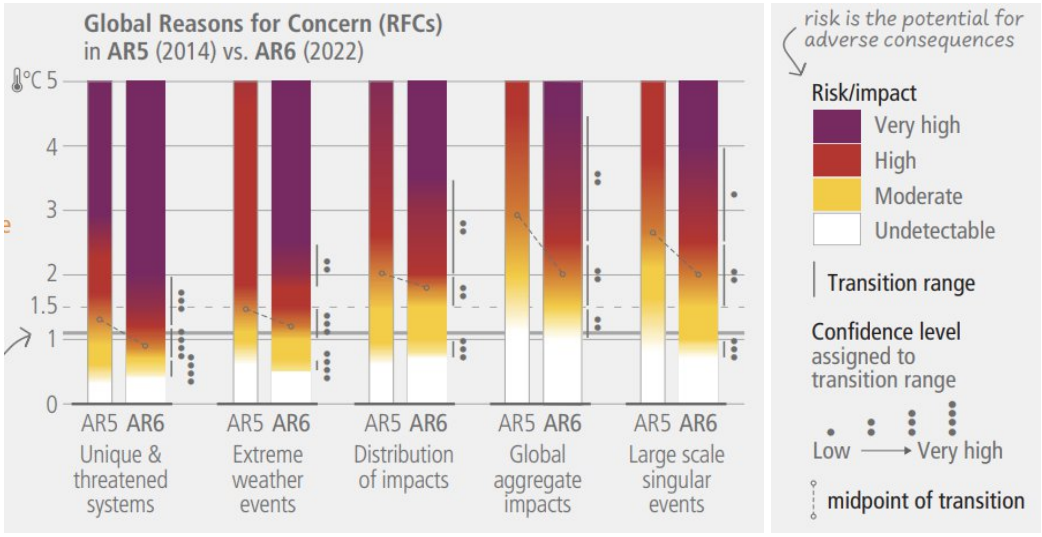
38. The same picture applies to the production gap. This is also confirmed in the last report on the 'production gap', that was published in October 2023. In that report, UNEP concluded that the planned production of fossil fuels in 2030 was more than twice as big (approx. 110% in over-production) than a production that could be consistent in limiting the warming to 1.5°C.[70]

39. The IPCC makes the risks related to this disastrous course clear on the basis of, inter alia, the five global reasons for concern (see para. 2.3.5 of the Judgment).

2.4 Significant global dangers and the five reasons for concern

40. It was already explained in Section 5.5 of the statement of defence on appeal that the IPCC has in the meantime concluded that the highest levels of climate risks will occur for the five reasons for concern (*Reasons for Concern*) at lower levels of global warming than previously thought. In the figure below from IPCC AR6 SYR it can be seen how the risk estimate has been modified relative to IPCC AR5. Higher risks are now connected to lower temperatures, and are already occurring with the current warming. In the figure below, for each of the five reasons for concern a comparison has been made between the risk columns in AR5 and AR6. There is every reason for concern with a declining dotted line between the columns indicating how greater risks will now occur with lower warming:[71]

[67] Exhibit MD-518, p. 2312 and p. 2316 (Figure 7).
[68] Exhibit MD-523, Emissions Gap Report 2023: Broken record, p. 28.
[69] Ibid, p. 31. This analysis includes data and literature up to and including 25 September 2023, see p. 11.
[70] Exhibit MD-524, Production Gap Report 2023: Phasing down or phasing up? Top fossil fuel producers plan even more extraction despite climate promises, p. 4.
[71] Exhibit MD-495A, p. 75.



41. This figure shows that in comparison to the old situation in AR5, a warming of 2°C causes the risk level for all Reasons for Concern (RFCs) in AR6 to switch from average to high (RFC3, 4 and 5) and from high to very high (RFC1 and 2). If warming remains limited to 1.5°C, the risk levels for RFC1 and 2 in AR6 are still high, but remain average for RFC 3 to RFC 5. The increased risks since AR5 can consequently be deemed very concerning.

42. A total of 127 'key risks' are connected with these 5 global reasons. These key risks are in turn divided over eight categories, including adverse impact on ecosystems and biodiversity, risks to ecosystem services, risks to people and infrastructure in low-lying areas (think of railways/roads, bridges, power stations, pipelines, dams, foundations, etc.), system risks as a result of extreme weather circumstances, including the loss of physical infrastructure and networks that provide critical goods and services, adverse impact on water security, adverse impact on food security, dangers to physical and mental health of people and risks to peace and safety.[72]

43. It has been extensively explained in these proceedings that limiting these comprehensive physical, economic and societal risks is of the greatest importance for all people in the world, including in the Netherlands.[73]

44. It is also evident that the consequences and risks of climate change are not limited to country borders, and the IPCC also emphasises this in its last report:

    "Increasing transboundary risks are projected across the food, energy and water sectors as impacts from weather and climate extremes propagate through supply-chains, markets, and natural resource flows (high confidence) and may interact with impacts from other crises such as pandemics."[74]

45. In addition, every region in the world has in the meantime been exposed to serious and/or frequent climate risks, which in turn can put a cascade of effects into motion and can therefore entail implications that jump via natural and human systems to other regions and sectors: "*Climate hazards can initiate risk cascades that affect multiple sectors and propagate across regions following complex natural and societal connections*".[75]

46. The consequences of this are significant, both in the form of human suffering, impact on public health and food security and in terms of economic loss. According to the European Commission,

[72] See, inter alia, Summons, sections VII.1 and VII.2. See also para. 2.3.5 Judgment.
[73] Ibid, in particular paras. 468 et seq. See also Summons, paras. 520 et seq.
[74] Exhibit MD-495A, p. 99.
[75] Exhibit MD-495A, pp. 100 and 101. See also p. 68.

for example, more than half of global GDP depends on nature and the services it provides.[76] Aside from the inherent and invaluable value of ecosystems, a loss therefore thus also results in significant economic damage. In addition, more than 75% of global food crop types depend on pollination by animals, the populations of which are under great pressure due to climate change and other human actions.[77] See the IPCC in AR6 SYR:

"Climate change has caused substantial damages, and increasingly irreversible losses, in terrestrial, freshwater, cryospheric, and coastal and open ocean ecosystems (high confidence). Hundreds of local losses of species have been driven by increases in the magnitude of heat extremes (high confidence) with mass mortality events recorded on land and in the ocean (very high confidence). Impacts on some ecosystems are approaching irreversibility such as the impacts of hydrological changes resulting from the retreat of glaciers, or the changes in some mountain (medium confidence) and Arctic ecosystems driven by permafrost thaw (high confidence)."[78]

2.5 The risks of passing tipping points in the climate system and the consequences thereof

47. In the context of this scientific update, Milieudefensie et al. will now first pay attention to tipping points, which fall under RFC5 of the above reasons for concern. Tipping points in the climate system refers to the situation in which a critical threshold is overrun, so that a change in parts of a climate system occurs that maintains itself, even if the underlying causes are removed. Tipping points lead to substantial, widespread, often abrupt and often (in any event on human time scales) irreversible consequences.[79] As already discussed in the introduction, science pays a lot of attention to the sizeable risks and possible consequences of passing tipping points. Important (scientific) reports have been published about this in the past year. This concerns, inter alia, the report State of the Cryosphere 2023, the report Climate Tipping Points: Insights for Effective Policy Action of the OECD and the Global Tipping Points Report, published during COP28.

48. A few important findings from those reports will be explained below on the basis of the GTP Report. More than two hundred authors and 25 agencies collaborated on this international research report, which is seen as the most comprehensive study into tipping points in our climate system up to now. The list with references to associated publications alone is more than 100 pages. The GTP Report forms an addition to findings of the IPCC, both because it contains the most up-to-date findings and because it goes into climate tipping points much more comprehensively and the negative societal, economic and political disruption that would ensue therefrom.

49. The report identifies a total of 26 tipping points in (i) the cryosphere, (ii) the biosphere and (iii) the ocean currents and circulation in the atmosphere. The cryosphere encompasses the frozen parts of the Earth, like the ice caps, glaciers, sea ice and permafrost. The tipping points are, inter alia, the melting of the West Antarctic ice cap and the Greenland ice cap, the melting of other glaciers worldwide, and the thawing of permafrost. The biosphere encompasses natural ecosystems such as tropical rainforests, boreal forests, the tundra, lakes, coral reefs and fish stocks, whereby the degradation of those important ecosystems is deemed a tipping point. Oceanic and atmospheric circulation refers to, inter alia, the warm Gulf Stream in the North Atlantic Ocean and the Subpolar Gyre. These global circulating currents are essential for the transport of heat, oxygen, CO_2 and

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[76] Communication from the European Commission 20 May 2020, COM(2020) 380, EU Biodiversity Strategy for 2030, pp. 1 to 3, available on https://eur-lex.europa.eu/resource.html?uri=cellar:a3c806a6-9ab3-11ea-9d2d-01aa75ed71a1.0008.02/DOC_1&format=PDF.

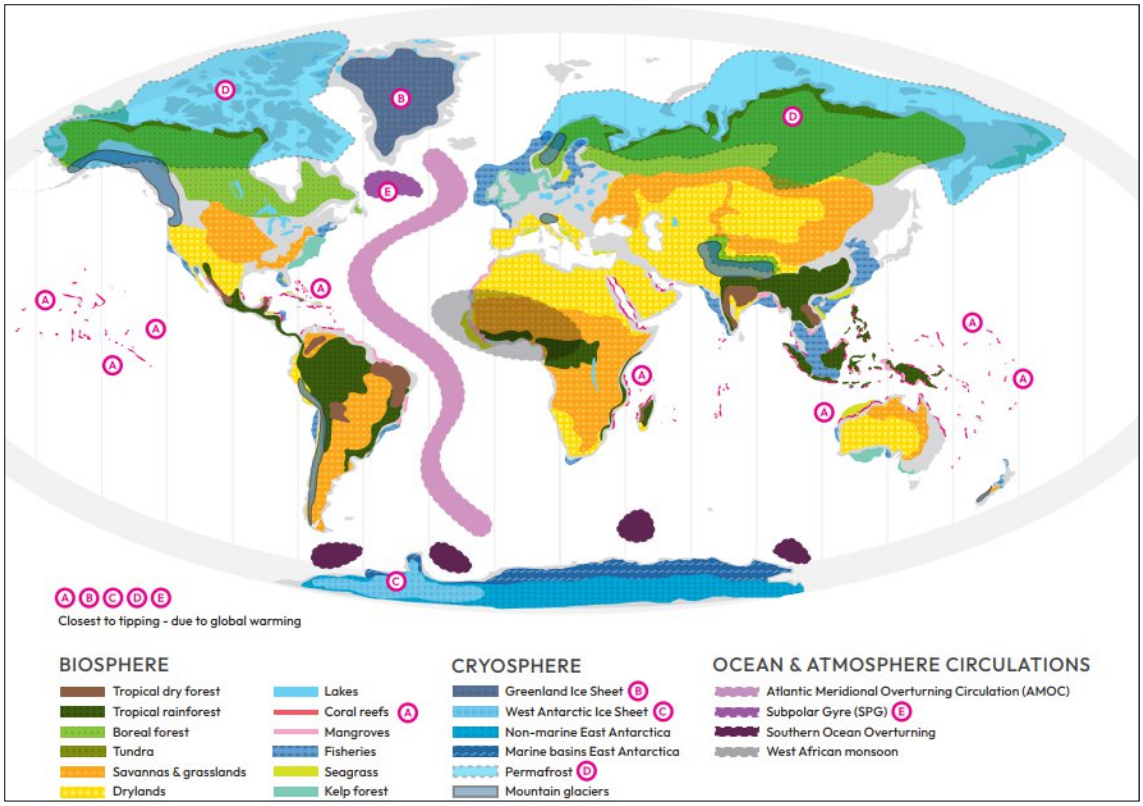
[77] Ibid, p. 2 ("*For instance, more than 75% of global food crop types rely on animal pollination.*") and Exhibit MD-510, p. 9, Exhibit MD-347, p. 48 (TS.B.3.2), p. 61 (TS.C.3.5), p. 69 (Table TS.1), p. 109 (TS.E.4.1): "*Species extinction levels that are more than 1000 times natural background rates as a result of anthropogenic pressures, and climate change will increasingly exacerbate this (high confidence).*").

[78] Exhibit MD-495A, p. 5 of the Summary for Policymakers (under A.2.3).

[79] Exhibit MD-574B, p. 41. The definition also encompasses gradual (non-abrupt) and irreversible tipping points.

nutrients in the oceans (and consequently for life in the oceans), and are also decisive for regional weather circumstances and the food production in large parts of the world.[80]

50. The GTP report shows that with the current warming of 1.2°C it is already likely that coral reefs in warm waters will die out on a large scale and that it cannot be excluded that four other tipping points will be passed: the melting of the Greenland and West Antarctic ice caps (which can cause a sea level rise of 12 metres in total), the collapse of the Subpolar Gyre (a circular sea current at the ocean's surface south of Greenland) and the abrupt thawing of certain parts of the permafrost.[81] The various tipping points are indicated by different colours in the illustration below. Letters A to E indicate which systems are closest to tipping.[82]



51. With a warming of 1.5°C, according to best estimates the danger zone will be reached for three extra tipping points: the boreal forest (the forests in Alaska, Russia, Canada and Scandinavia), the mangroves and the seagrass meadows.[83] As of 2°C, the danger zone for various other tipping

[80] Exhibit MD-574A, NOS 8 December 2023, 'Wetenschappers waarschuwen in Dubai voor 'domino-effecten' klimaatverandering' ['Scientists at Dubai conference warn against "domino effect" of climate change'], pp. 1-2.

[81] Exhibit MD-574B, p. 20. See also pp. 61 to 65 (about the Greenland and West Antarctic ice cap), pp. 131 to 134 (about the Subpolar Gyre), pp. 72 to 76 (about permafrost) and pp. 85, 105 to 108 (about coral reefs). The consequences of the three first mentioned tipping points are discussed below. The large-scale die-off of coral reefs will lead to loss of ecosystems and biodiversity (25% of all sea animals are to a certain degree dependent on coral reefs), loss of coastal protection, loss of fish stocks (half a billion people are partly dependent on healthy coral reefs for their sustenance).

[82] Exhibit MD-574B, p. 21.

[83] Exhibit MD-574B, p. 20. See also pp. 82, 89 to 91 and 255 (about the boreal forest) and pp. 108 to 114 and p. 255 (about mangroves and seagrass meadows). Tipping points in the boreal forest (dieback in the south and expansion to the north) can lead, inter alia, to an increased risk of forest fires and can change regional weather and precipitation patterns. Loss of mangroves and seagrass meadows leads, inter alia, to reduced coastal protection, increased vulnerability to weather extremes, loss of biodiversity and ecosystems, adverse impact on fishing stocks and food security, loss of an important source for carbon storage, as well as additional emissions of stored carbon stocks.

points will be reached, including those for the Amazon rainforest and the marine basin in East Antarctica.[84]

52. For some tipping points it is not easy to define a critical limit, such as for the significant weakening or even collapse of the warm Gulf Stream in the North Atlantic ocean (AMOC). This is in part because the AMOC has only been consistently monitored since 2004. The GTP report therefore does not give a bandwidth. There are, however, clear indications that the Gulf Stream is losing resilience, and may be at its weakest point in 1000 years. Several studies warn that the AMOC could be nearing a tipping point.[85]

53. On 9 February 2024 – i.e. after publication of the GTP report – a new peer-reviewed study of Dutch scientists was published which again should be setting off alarm bells. The study is seen as a "*major advance in AMOC stability science*" and shows that a slow weakening of the AMOC due to the inflow of sweet water as a result of the melting of the Greenland ice cap can lead to a very abrupt collapse in less than 100 years.[86] In their own words, the scientists involved are "*shocked at the forecast speed of collapse once the point is reached*".[87] With the help of "*exceptionally complex and expensive computing systems*" it has now been determined with greater reliability that (i) the AMOC is on the road to a tipping point and (ii) the AMOC can suddenly collapse. "*There was not yet enough data to say whether this would occur in the next year or in the coming century, but when it happens, the changes are irreversible on human timescales*", according to one of the authors.[88]

54. The collapse of the AMOC would change regional climate circumstances worldwide considerably, including in Europe, which will adversely impact vegetation and the crop productivity in great parts of the world, with far-reaching consequences for food security.[89] According to the GTP report, half of all grain and corn producing areas on Earth will be in danger and drastic consequences would arise for ecosystems worldwide, including further drying out of the Amazon area, and weather extremes would increase.[90] A further deterioration of the AMOC – which has already been predicted – would, however, have significant consequences, "*essentially a scaled-down version of those resulting from a complete collapse*" according to the OECD.[91]

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[84] Exhibit MD-574B, p. 20. See also pp. 59 and 65 of MD-574B and pp. 8 and 12 of Exhibit MD-506 (with regard to East Antarctica, which would lead to rising sea levels (up to 19 metres) and disruption of global circulation currents) and pp. 81, 86 to 89 and 182 to 185 (about the tropical rainforest). The drying out of the Amazon forest would have enormous local and regional consequences, including for the health and well-being of the millions of people who live there and for many hundreds of thousands of species of animals, plants and trees. Drought in the Amazon also disrupts food and transport systems. However, there can also be significant consequences for global rainfall patterns at the global level.

[85] Exhibit MD-574B, pp. 128 to 131 ("*Despite the caveats mentioned above, these results amount to a serious warning that the AMOC might be en route to tipping*") and p. 155. See also Exhibit MD-507, p. 28: "*current early-warning signals are consistent with the AMOC losing stability and being close to a critical transition*".

[86] Exhibit MD-578B, CNN 9 February 2024, 'Critical Atlantic Ocean current system is showing early signs of collapse, prompting warning from scientists', pp. 2 and 3. See also Exhibit MD-578A, The Guardian 9 February 2023, 'Atlantic Ocean circulation nearing 'devastating' tipping point, study finds', pp. 1-3.

[87] Exhibit MD-578A, The Guardian 9 February 2023, p. 1.

[88] Exhibit MD-578A, The Guardian 9 February 2023, p. 2.

[89] Exhibit MD-574B, pp. 177, 186, 192 (Story of one collapse: AMOC) and p. 254 (Table 3.3.1: Impacts of ESTPs). See also Exhibit MD-507, p. 27, where the collapse of the AMOC is described as a "*critical threat to global food security*", and pp. 28 to 30: "*Beyond impacts on agriculture, a serious weakening or collapse of the AMOC would have profound implications for ecosystems, human health, livelihoods, food security, water supply and economic growth, <u>especially in the regions around the North Atlantic</u>.*" (emphasis added by legal counsel)

[90] Exhibit MD-574B, pp. 192, 254 (Table 3.3.1: Impacts of ESTPs). See also p. 131 about other consequences: "*A collapse of the AMOC would influence sea level rise along the boundaries of the North Atlantic, modify Arctic sea ice and permafrost distribution (Schwinger et al., 2022; Bulgin et al., 2023), reduce oceanic carbon uptake (Rhein et al., 2017) and potentially lead to ocean deoxygenation (Kwiatkowski et al., 2020) and severe disruption of marine ecosystems (including changes in the North Atlantic Subpolar Gyre, see below), impacting North Atlantic fish stocks*."

[91] Exhibit MD-507, p. 28.

55. The collapse of the Subpolar Gyre (the circulating gulf stream to the south of Greenland) can in part lead to similar consequences such as the collapse of the warm Gulf Stream, albeit on a smaller scale, but still with an unpredictable impact.[92] The collapse of this gulf stream can, moreover, (also) occur very abruptly, starting with 1.1°C warming.[93] The world is thus already in this danger zone.

56. What the above-mentioned examples illustrate above all, and what science explains, is that parts of the climate system do not operate separately from each other, but are interconnected, or influence each other via the global temperature increase.[94] This means that the tipping of one subsystem can in turn lead to destabilisation or even the tipping of another subsystem.[95]

57. This interaction between different systems could effectively lower the thresholds for putting tipping point events in motion (so that the chance of passing tipping points increases).[96] In addition, tipping points can in themselves activate natural processes that lead to extra emissions of CO_2 and other greenhouse gases (so-called positive feedback loops). The thawing of permafrost and large-scale die-off of trees (with a greater chance of forest fires) are examples of these processes (positive feedback loops) which can lead to the emission of greenhouse gases that were previously stored in nature.[97] These processes cannot be properly predicted and modelled. This means that the risks and consequences thereof might be (seriously) underestimated, particularly as they are not yet fully included in many climate models.

58. AR6 SYR has the following to say about that possible underestimating as a result of poor modelling:

    "*Additional ecosystem responses to warming not yet fully included in climate models, such as GHG fluxes from wetlands, permafrost thaw, and wildfires, would further increase concentrations of these gases in the atmosphere (high confidence).*"[98]

59. The State of the Cryosphere 2023 report and the GTP report underscore these great dangers of not yet anticipating or only barely anticipating the aforementioned positive feedback loops in model calculations.[99]

60. With regard to the thawing of the permafrost, with a warming of 1.2°C approximately a quarter of the permafrost at the land surface is expected to be lost and 40% with a warming of 1.5°C.[100]

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[92] Exhibit MD-574B, p. 255 (Table 3.3.1: Impacts of ESTPs),), where, inter alia, the following consequences are described: "*20-30cm sea level rise along North-East seaboard of North America, amplified cold winter blocking events in Europe & increase in summer heat wave frequency, large changes in ecosystems in affected regions, major disruptions of agriculture in Northern Europe and Sahel, impacting food security*".

[93] Exhibit MD-574B, pp. 125, 131-134, 255. P. 134: "*the SPG collapse can occur much faster than AMOC collapse, on the timescale of just of only a few decades (Armstrong McKay et al., 2022). Armstrong McKay et al. (2022) estimated global warming threshold of ~1.8°C (1.1 to 3.8°C) for the SPG collapse (high confidence) […] Abrupt future SPG collapse is diverse in the CMIP6 models, occurring as early as the 2040s (~1 to 2°C) but in only a subset of models. However, as these models better represent some key processes, the chance of SPG collapse is estimated at 36-44 per cent*".

[94] Exhibit MD-574B, p. 145.

[95] This was discussed at first instance, but has also been explained in further detail in Exhibit MD-574B, pp. 144 to 154 (Chapter 1.5, Climate tipping point interactions and cascades) and Exhibit MD-507, pp. 22 to 26 (Chapter 2.2, Potential cascading impacts of climate system tipping points).

[96] Exhibit MD-574B, p. 144.

[97] Ibid.

[98] Exhibit MD-495A, p. 82. See also Exhibit MD-347, p. 69 (TS.C.13.2): "*Complex interactions of climate change, land use change, carbon dioxide fluxes and vegetation changes, combined with insect outbreaks and other disturbances, will regulate the future carbon balance of the biosphere, processes incompletely represented in current Earth system models*."

[99] Exhibit MD-506, pp. 31-32. Exhibit MD-574B, p. 75, see also p. 76, and p. 165: "*Despite our growing understanding of key Earth system feedbacks and interactions, some are currently not well represented in many computer models. As a result, tipping dynamics and interactions between tipping systems are less likely to emerge in model simulations, making comprehensive risk assessments difficult*."

[100] Exhibit MD-506, p. 31.

According to the best estimate, up to 2100 this will be accompanied by annual additional emissions of 2.5 Gt CO2e per year (150 Gt CO2e in total).[101] Emissions of 2.5 Gt CO2e per year is equal to the annual emissions of India, which we may already be stuck with, even if warming is limited to 1.5°C. This is a frightening conclusion. Anyone who realises, in view of the above, that these estimates may well be an underestimation of the risks of (abrupt and gradual) thawing processes, can imagine the threat this involves. There is a good reason that the GTP report concludes that "*Communicating a 'threshold' for permafrost that indicates a 'safe zone' is misleading, as every tenth of a degree of global warming leads to significant impacts in permafrost-dominated landscapes (Schuur et al. 2022)*".[102]

61. The IPCC makes it clear in AR6 SYR that the chance of feedback loops – and/or an underestimating of climate sensitivity – entails that even temperature increases of over 4°C, although unlikely in view of the climate promises of countries, cannot be excluded.[103]

62. Other kinds of feedback loops can also cause these kinds of reinforcing effects or vicious circles. For example, the disappearance of the white ice mass at the North Pole means that less sun is reflected from Earth's surface. The melting of floating (white) ice shelves will, in addition, lead to more CO_2 and more warmth being absorbed in the (dark) ocean, which in turn leads to further acidification of the ocean, oxygen depletion, rising sea levels (because warmer water has more volume), etc., with all associated consequences.[104]

63. The above leads to a disconcerting conclusion. As already mentioned, we are already in the danger within which individual tipping points may be overrun. In view of the climate system's delayed response to CO_2 emissions and the possibility that certain positive feedback loops can cause additional greenhouse gas emissions, which are probably still underestimated, it may occur that we reach a "*point of no return*" for certain tipping points, without the world realising that the time to still be able to intervene has passed.

64. In view of the above-described insights that at this point in time we are already in the danger zone in which individual tipping points can be reached (or have already been reached), the understanding of the interaction between various tipping points and the generally destabilising effects thereof for other tipping points is becoming ever more important. This can result in domino effects or chain reactions ('tipping cascades'), whereby one system collapsing in turn leads to the collapse of a following system.

65. There is still uncertainty about the precise limits for passing tipping points and the worst-case scenario of tipping cascades, but the catastrophic consequences associated with it call for appropriate (precaution) measures, as also emphasised by the OECD in its last report with policy-relevant insights into the risks of tipping points (emphasis added by legal counsel):

"*IPCC AR6 pays special attention to a number of low-probability outcomes that may be associated with high levels of risk, such as low-likelihood high warming scenarios and low-likelihood high-impact events such as tipping points (Chen, 2021). However, the IPCC uncertainty guidance, focusing on likelihoods (based on probabilities), and levels of confidence (based on an evaluation*

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[101] Exhibit MD-506, p. 33: *"Permafrost emissions today and in the future are on the same scale as large industrial countries, but can be minimized if the planet remains at lower temperatures. If we limit warming to 1.5°C, emissions through 2100 will be about as large as those of India today, 2.5Gt/ year, totaling around 150Gt CO2 by 2100. Should we instead reach 2°C, permafrost emissions will about equal those of the almost the entire European Union* * today on an annual basis, 3–4Gt/year, for about 200 Gt CO2-eq by 2100."* See also p. 77 GTP report, where a similar estimate is made.

[102] Exhibit MD-574B, p. 76.

[103] Exhibit MD-495A, p. 63 (footnote 106).

[104] See, inter alia, Exhibit MD-506, pp. 34, 39 to 43, 46 to 51. On p. 48, for example, it is explained that acidification of the ocean makes it more difficult for shellfish to reproduce and to build and maintain their structures and negatively affects other water organisms. "*Such impacts have already been observed. These harmful impacts at the lower end of the marine food chain will cascade towards higher ends of the food chain, such as whales and humans.*"

of evidence and agreement across models), are easily misinterpreted. For example, low confidence, in IPCC terms, does not provide confidence on the absence of the potential outcome; rather it provides an indication of the poor state of knowledge on this topic. In addition, an unlikely probability can be associated with high-impact outcomes and be therefore of high importance to risk assessments. Thus, even if climate system tipping points had low probability of being crossed [at] lower levels of warming, which the more recent scientific literature suggests may not be the case, their uncontested potential for catastrophic impacts nonetheless necessitate their incorporation into risk assessments, even if confidence in these outcomes is low."[105]

66. The OECD report has also established, however, that the dangers up to now have not been addressed with the needed urgency. For instance, the political domain incorrectly interpreted certain uncertainties. In some cases this was worsened by lobby activities that were geared to undermining the faith in climate science (emphasis added by legal counsel):

    "*Historically, however, uncertainties have undermined government responses on climate change. With scientists wary of overstating confidence in their results, confidence levels and uncertainties have often been interpreted as implying climate change may not be an issue after all. In some cases this has been exacerbated by concerted lobbying efforts by vested interests to undermine trust in scientific results.*"[106]

67. Shell – directly and indirectly through interest groups – also formed part of such an undermining of the trust in climate science, the consequences of which can be felt to this day.[107] In this case too Shell does not hesitate to inform the court incorrectly, selectively and in a misleading manner. Milieudefensie et al. would like to remind the court that at first instance, on the penultimate session day, Shell dedicated 30 pages of notes on oral pleadings on presenting the "*correct facts relating to the science*".[108] In those notes on oral arguments, Shell accused Milieudefensie et al. of incorrectly presenting the science and it attempted to trivialise the risks presented by Milieudefensie et al. That presentation of Shell was so selective and misleading that Dr Leo Meyer, lead author of the IPCC AR5 Synthesis Report, felt the need to publicly correct Shell in the NRC.[109]

68. It is clear that passing tipping points in the climate system can cause far-reaching global and catastrophic consequences. Below Milieudefensie et al. will provide a brief update on important new findings relating to the negative societal impact this can entail.

2.6 Societal impact of climate change

69. The destabilisation of parts of the climate system as described above can activate negative tipping points in society, which in turn can adversely impact the further approach to climate change and the capacity of societies to respond.[110] The GTP report describes negative societal consequences

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[105] Exhibit MD-507, p. 58.
[106] Ibid.
[107] See, inter alia, Shell's own reference in its notes on oral arguments of December 2020: Facts and questions of the District Court (para. 59), where Shell refers to the fact that it had withdrawn from the "Global Climate Coalition" in 1998. This coalition of the large oil companies (including Shell) and the American Petroleum Institute, founded in 1989 provided a large-scale and coordinated public campaign to sow doubt about climate science. See Exhibit MD-418, pp. 1 to 8. Shell's withdrawal in 1998 could not, of course, reverse the damage caused in the preceding nine years, see also pp. 7-8: "*Meanwhile, the GCC began to disintegrate, as some members grew uncomfortable with its hard line. But the tactics, the playbook, and the message of doubt were now embedded and would outlive their creators. Three decades on, the consequences are all around us*." It is for that reason that former vice-president Al Gore describes the actions of the oil companies in this coalition as "*the moral equivalent of a war crime.*" See also Exhibit MD-560, pp. 28-29 and pp. 61 to 67 about the Global Climate Coalition and Shell's involvement in this respect (which also continued after 1998 through Shell's involvement in the American Petroleum Institute).
[108] Shell's Notes on oral arguments of 15 December 2020: Science.
[109] NRC 22 December 2022, 'Advocaten van Shell winkelen selectief in de IPCC-rapporten' ['Shell attorneys selective in their choice of IPCC reports'], available on https://climatecontact.nl/media/1051/22-12-20-shell.pdf.
[110] Exhibit MD-574B, pp. 193-194.

of climate change and their tipping points, including: (i) the breakdown of collective norms and values (anomie), (ii) displacement, and (iii) financial destabilisation. These consequences will be discussed briefly below. It must first be noted that this description – because of the limited size of these written arguments – cannot do justice to the extent of the risks and the human suffering that climate change causes and will cause worldwide. This brief description too will, however, once again make it clear that the maximum achievable emission reductions must be achieved to limit the greatest possible risks, and that moving more slowly is not an option.

70. Firstly, climate change and weather extremes can result in anomie: the breakdown of social norms, social bonds and social reality, which can result in disorder, isolation, turning away from society, deterioration of mental health and increased cases of suicide.[111] Weather extremes like forest fires and floods undermine feelings of safety, self-sufficiency and the ability of people to understand their environment, and this has consequences for people's mental health.[112] Aside from weather extremes, there is proof of the poorer mental health of young people in particular as a result of climate change. In a large-scale survey among 10,000 young persons in 10 countries, more than 45% of the young people indicated that climate change had an adverse impact on their daily life and functioning. 75% indicated that they are fearful of the future and 83% believe that adults have failed to protect the Earth. The inadequate climate approach causes fear and stress, also known as eco-anxiety, feelings of betrayal and being abandoned by governments and adults.[113] However, it is not just young people whose mental health is adversely impacted by climate change: "*it is negatively affecting the mental health and emotional wellbeing of people of all ages globally, but more profoundly of poor and vulnerable populations (Lawrence et al., 2021; Whitmore-Williams et al., 2017), as well as women and Indigenous people (IPCC AR6, 2022; Sultana, 2022).*"[114]

71. Displacement is another possible consequence of climate change. In addition to displacement (forced fleeing from danger), the increasing number of weather extremes can also lead to migration ("voluntary" departure) and immobility (the inability to leave an affected area). This can be caused by such things as increased exposure to dangers, flooding, coastal erosion, rising sea levels, lengthy periods of drought and heatwaves, effects on the water supply and other vital human systems and infrastructures and threats to existence and housing.[115] In view of the fact that 3.3 – 3.6 billion people worldwide already live in areas that are particularly vulnerable to climate change (see para. 31 above), it is likely that more and more people will become displaced. The IPCC concluded in this respect: "*Climate and weather extremes are increasingly driving displacement in Africa, Asia, North America (high confidence), and Central and South America (medium confidence).*"[116]

72. Lastly, climate change can also have significant consequences for the global financial system. Attention is increasingly being paid to those possible consequences and studies show that climate-related damage will have consequences for the stability of the worldwide financial system, in particular when tipping points are passed. This could lead to gradual or abrupt destruction of companies' capital, reduction in profitability, deterioration of liquidity and a higher percentage of defaults and bankruptcies, which in turn can lead to an increase in debts that banks cannot collect and banking crises.[117] The insurance industry too can be overwhelmed by climate extremes and tipping points. Almost 9 years ago, the CEO of AXA stated: "*A 2°C world might be insurable, a 4°C*

[111] Exhibit MD-574B, p. 195.
[112] Exhibit MD-574B, p. 195.
[113] Exhibit MD-574B, p. 195. See also https://milieudefensiejong.nl/klimaatstress/.
[114] Exhibit MD-574B, p. 195. See also Exhibit MD-520, p. 1628 in which, based on many studies, the various consequences of climate change for mental healthy are described.
[115] Exhibit MD-574B, p. 197.
[116] Exhibit MD-495A, p. 51. See also p. 6 (under A.2.5).
[117] Exhibit MD-574B, p. 201.

world certainly would not be (Bacani, 2016)."[118] Today, with a warming of 1.2°C, we can already see that insurers are excluding coverage or are completely withdrawing from certain areas.[119]

73. As if all of this is not concerning enough, climate damage, and concomitantly the consequences of climate change for the financial sector, are probably still being significantly underestimated:

    "*However, by far the biggest issue with the existing empirical evidence, predictions and models that try to estimate climate damage for the financial sector is that they do not account for Earth system tipping points (Keen et al., 2022; Galaz et al., 2018)*"[120]

74. All these described consequences can, in addition, reinforce each other and ultimately affect the options for addressing the climate crisis, according to the GTP report.[121] The GTP report's key message and warning: "*If societies fail to re-stabilise the Earth system, we will not stay in a business-as-usual state. Rather, through mechanisms of negative social tipping, another social system state will emerge, likely characterised by greater authoritarianism, hostility, discord and alienation.*"[122]

2.7 Consequences of climate change in the Netherlands

75. The above updates relating to the consequences of climate change are – partly in view of the catastrophic and global effects, as well as the possible domino effects – very relevant for all people in the world, including Dutch inhabitants.[123] In this section a number of recent developments will be discussed that specifically relate to the Netherlands.

76. The year 2023 was both the warmest and the wettest year ever measured in the Netherlands. The spring was exceptionally dry, with a large precipitation shortfall halfway through the growing season. In the second half of the year, in contrast, long-lasting and substantial rainfall caused flooding.[124] In 2023 the highest water temperature ever was measured in the Wadden Sea region. In addition, significant consequences of climate change have become more visible. The warming of the Wadden Sea has an impact on the fish stocks and also has other adverse consequences for biodiversity.[125] The tidal flats, that are essential breeding and wintering grounds for millions of migratory birds, are at risk of disappearing due to accelerated rising sea levels.[126]

77. In October 2023, the Royal Netherlands Meteorological Institute (KNMI) published new climate scenarios for the first time since 2014. These scenarios (again) show that climate change will bring about that in the Netherlands we will increasingly have to deal with heat waves, extreme precipitation and lengthy droughts and that these changes have consequences for our safety, our health and nature.[127] In addition, the sea level will rise, both for European Netherlands and for

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[118] Exhibit MD-574B, p. 201.

[119] Exhibit MD-574B, p. 201. See also Exhibit MD-512A, p. 43: "*Climate change is dramatically shifting the landscape of risks, with the number of severe and frequent disasters forecast to double globally by 2040, causing insurance prices to rise. In places where extreme weather events increasingly wreak havoc, homeowners have seen prices climb by as much as 57 per cent since 2015, and people are struggling to afford coverage. Meanwhile, in the face of rising losses, some insurance companies in at-risk areas have decided to limit the amount or type of damages they can cover, cancel policies or leave the market altogether*". See also Exhibit MD-512C, AP News, California insurance market rattled by withdrawal of major companies, pp. 1 to 4.

[120] Exhibit MD-574B, p. 201: "*Research on the significant, non-linear effects of climate damages on the global economy is well established (Burke et al., 2015; Carleton and Hsiang, 2016; Diffenbaugh and Burke, 2019; Hsiang et al., 2017; Martinich and Crimmins, 2019), albeit likely severely underestimating climate damage (Keen 2021; Winter and Kiehl 2023)*."

[121] Exhibit MD-574B, p. 193, p. 196, p. 199, p. 201.

[122] Exhibit MD-574B, p. 193.

[123] See also Summons, paras. 468-473.

[124] Exhibit MD-575F, KNMI, The state of Our Climate in 2023: Dutch weather in times of climate change, pp. 3 to 11.

[125] Exhibit MD-575H, p. 1 to 3.

[126] Ibid.

[127] Exhibit MD-498A, p. 1. See also paras. 2.3.7 – 2.3.9. of the Judgment.

Caribbean Netherlands. The chance of severe hurricanes with abundant rainfall on Sint Eustatius and Saba will increase in the future.

78. The KNMI works with the following scenarios: a scenario with low emissions in which global warming is limited to 1.7°C and a scenario with high emissions in which the Earth warms by up to 4.9°C this century. Further warming in any event means that the Dutch summers will become drier and the winters wetter. The degree in which this occurs can differ. That is why the KNMI uses a wet variant within the low and high emissions scenarios, with a significant increase in precipitation in the winter and slightly drier summers, and a dry variant, with a lot of drought in the summer and slightly wetter winters.[128] The KNMI uses the same method for the BES islands (Bonaire, Sint Eustatius and Saba), but looks at the wet and dry season, instead of the summer and winter. With regard to the BES islands, in all scenarios the temperature and wind speed will increase and precipitation will decrease.[129]

79. The high emissions scenario assumes an increase in emissions at the current pace to 2080 and only sees a levelling off after that. The KNMI acknowledges that this is probably an overestimation of the CO_2 emissions. However, the KNMI points out (just like that IPCC) that there is still the possibility that this high temperature increase will occur with lower emissions, e.g. because climate-sensitivity turns out to be high or because feedback loops in the climate system lead to extra natural emissions, e.g. due to deforestation, because oceans absorb fewer greenhouse gases, or because greenhouse gases are released through the thawing of permafrost. The KNMI points out – the same as the findings previously described above – that climate models do not yet take sufficient account of these feedback loops (positive feedback loops).[130]

80. The possible consequences of various processes that can lead to tipping points have not been included in the climate models that the KNMI has used for its climate scenarios, because these processes are not easy to simulate and are therefore difficult to express in numbers. This concerns the accelerated erosion of the Western Antarctic ice cap, changes of large-scale ocean currents like the North Atlantic Gulf Stream and the thawing of permafrost.[131] It is precisely those tipping points that can have great consequences for the rising sea level and the future climate in the Netherlands (including Caribbean Netherlands). The KNMI has included important findings about this. The following can be said in this respect. The KNMI'23 scenarios look further ahead than the scenarios published in 2014 (up to 2150 instead of 2085 and for sea level rises to 2300). Because of the improved insights into the contribution of Antarctica to the rising Dutch sea level, in its scenarios the KNMI now – contrary to 2014 – also presents an estimate of the highest possible rise in sea level in the future.[132] The KNMI points out with regard to the Western Antarctic ice cap that "*the sea level in our region in the far future will be virtually fully determined by the speed with which the Antarctic Ice Cap loses mass. According to the high emissions scenario, the rise in sea level around 2300 will be 2 to 6 metres. If uncertain ice cap processes on the Antarctic are included, this could increase to more than 17 metres.*"[133] In this scenario the upper limit of the rise in sea level can increase to 2.5 metres in this century.[134] In Caribbean Netherlands (Bonaire in particular) this can even increase to 3.4 metres.[135]

81. In the low emissions scenario (excluding tipping points), the estimation of the rise in sea level in this century is significantly lower, but is nevertheless impactful ("*In the low emissions scenario the*

[128] Exhibit MD-498B, p. 9.
[129] Exhibit MD-498B, p. 36.
[130] Exhibit MD-498B, p. 59.
[131] Exhibit MD-498B, p. 59. See also Exhibit MD-574B, p. 179: "*typical modelling approaches struggle to accurately represent ice sheet dynamics, leading many studies to underestimate projections of sea level rise*".
[132] Exhibit MD-498B, p. 55.
[133] Exhibit MD-498A, p. 33.
[134] Exhibit MD-498A, p. 32.
[135] Exhibit MD-498A, p. 39.

rise in sea level to 2100 will be reasonably strong (26-73 cm)."[136] Because the ice caps respond slowly, the sea level will continue rising this century and even for hundreds of years after this century, even if greenhouse gas emissions were reduced to zero tomorrow.[137] The speed and degree in which the rise in sea level will increase depends on the degree in which the balance between climate and land ice is destabilised in the coming century: "*The total quantity of emitted greenhouse gases plays an all-determining role in this respect*."[138]

82. Shortly after publication of the KNMI climate scenarios, a startling new study was published in the renowned scientific journal Nature Climate Change, entitled '*Unavoidable future increase in West Antarctic ice-shelf melting over the twenty-first century*'. That study reviews how quickly the floating ice shelves that can keep the glaciers of the West Antarctic ice cap under control can melt in different emission scenarios. The conclusion is that the "*point of no return*" has possibly already been passed: even if the warming is limited to 1.5°C, it is predicted that the ocean is warming significantly, causing the floating ice shelves to melt at a faster pace and the glaciers behind them to flow into the sea more quickly.[139]

83. A worrisome conclusion, according to the KNMI. In a press release that was issued especially for this study, the KNMI let it be known that the low sea level scenarios would consequently become more unlikely and that further study will show whether the KNMI scenarios need to be updated as a result.[140] It shows that climate science is developing at an incredibly fast pace, so that previously unlikely (but at no point excluded) scenarios may suddenly be dangerously closer. It shows once again the importance of applying the precautionary principle and the extreme urgency that is needed to bring about the maximum emission reductions to mitigate the greatest risks as much as is still possible.

2.8 Preventing overshoot is of vital importance

84. In line with this, it is also evident that all stops must be pulled out to limit the warming to 1.5°C and to limit any overshoot at all times as much as possible.

85. This is first and foremost of great importance, because the temperature goal of the Paris Agreement of 1.5°C was chosen, inter alia, because of the limited options for adaptation in case of warming above 1.5°C. The temperature goal of 1.5°C chosen in Article 2 of the Paris Agreement is, after all, a concrete realisation of the term dangerous climate change ('*dangerous anthropogenic interference with the climate system*'), as used in Article 2 of the UN Climate Convention of 1992. According to the Convention, the term dangerous climate change in part encompasses the danger of limited adaptation options for humans and the ecosystems on which humans are dependent.[141] By assuming the 1.5°C goal, the global community expressed a consensus on the realisation that higher warming comes with significant adaptation risks and adaptation limitations.

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[136] Exhibit MD-498B, p. 32. In Bonaire, the rise at the end of the century will be 31-78 cm in the low emissions scenario (p. 39). Because of the significant risks of climate change for the inhabitants of Bonaire, including the large risks for the habitability of the island and the continued existence of cultural heritage, Greenpeace Nederland has in the meantime started a lawsuit against the Dutch government, see https://www.greenpeace.org/nl/klimaatverandering/klimaatrechtvaardigheid/61952/eisers-klimaatzaak-bonaire/.

[137] Exhibit MD-498B, p. 32.

[138] Exhibit MD-498B, p. 32.

[139] Exhibit MD-499A, pp. 5-6 (under 'Implications').

[140] Exhibit MD-499B.

[141] Summons, paras. 455 to 457 in conjunction with 371. See also Milieudefensie et al.'s Notes on Oral Arguments 9, 17 December 2020, paras. 22 to 26.

86. Exceeding 1.5°C warming, which partly depends on the duration and extent of the excess, also increases all other risks related to climate change, including the chance of passing tipping points, according to the IPCC in AR6 SYR.[142]

87. An exceeding of the 1.5°C limit in any event leads to irreversible negative consequences for certain ecosystems such as those in the polar region, the mountains and by the coast.[143]

88. Exceeding of the 1.5°C limit also leads to a substantial increase in the risk of additional greenhouse gas emissions due to the previously mentioned feedback loops.[144]

89. In addition, as already stated, overshoot reduces the options for adaptation. Hard and soft adaptation limits have already been reached with the current warming.[145] According to the IPCC, at 1.5°C more limits will be reached.[146]

90. These findings are of crucial importance, because the IPCC makes it clear what significant risks are associated with the temporary exceeding of the 1.5°C limit. The best available climate science leaves no doubt about the fact that an overshoot is particularly dangerous.[147]

91. However, the reduction scenarios modelled by IAMs that were gathered by IPCC working group 3, are not geared to preventing overshoot. As previously discussed in these proceedings, almost all scenarios modelled by IAMs are based on Carbon Dioxide Removal ("**CDR**"), inter alia to later "compensate" an overrun of the carbon budget. This also applies to the biggest part of the modelled 1.5°C reduction pathways "*with no or limited overshoot*", the median of which comes to a peak temperature of 1.6°C[148] and net cumulative negative emissions with a volume of 220 GtCO2 (5.5 times the current annual global CO_2 emissions) by 2100.[149] The total quantity of modelled CDR is even higher, because CDR is modelled to achieve net zero emissions.[150] Modelled 1.5°C scenarios look at the end result, i.e. whether the temperature at the end of this century reaches 1.5°C (with a specific chance, like 50%). The scenarios generated by IAMs do not draw a distinction between – and have no preference for – immediate emission reductions compared to "compensation" afterwards. What is more, IAMs have been set up in such way that these future CO_2 removals are deemed more cost-efficient and consequently more attractive by applying a discount rate.[151] IAMs do not take account of the significant dangers and risks for humans and ecosystems on which humans are dependent.[152]

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[142] Exhibit MD-495A, p. 87.
[143] Ibid.
[144] Exhibit MD-347, p. 69 (TS.C.13.2).
[145] Exhibit MD-347, p. 84 (TS.D.2.1). The IPCC draws a distinction between hard and soft adaptation limits. Soft limits are those for which no further adaptation options are feasible at the moment, but that could become available in the future. Hard limits are those for which the existing adaptation options will no longer be effective and extra options are not possible. Hard limits will occur to an increasing degree with higher levels of warming.
[146] Exhibit MD-347, p. 84 (TS.D.2) and p. 85. See also Exhibit MD-347, p. 55 (TS.C.1.2), as well as Exhibit MD-477, p. 26.
[147] These warnings can be found in all AR6 reports, see also the references in Exhibit MD-495B, p. 3, as well as Exhibit MD-347, p. 69 and Exhibit MD-377, pp. 19-20. See also Exhibit MD-495B, p. 3 (with references to IPCC reports). See also Exhibit MD-503, pp. 3-4 (Insight 1: Questioning the myth of endless adaptation: mitigation is critical to avoid breaching adaptation limits).
[148] Exhibit MD-495A, p. 84.
[149] Exhibit MD-495A, p. 87: "*Modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot reach median values of cumulative net negative emissions of 220 GtCO2 by 2100 […]*".
[150] Exhibit MD355, p. 29 (under C.3.5, footnote 53).
[151] See Milieudefensie et al.'s Defence Brief of 19 December 2023, paras. 110 to 112 and 117 to 120. See also Exhibit MD-496G, pp. 3 to 6, and Exhibit MD-517, p. 6: "*High discount rates make future efforts comparably cheap. Since CDR is assumed to build up over decades and become available in large amounts only in the latter half of the century, the competition between mitigation now and removal later is given a significant cost advantage by high discount rates.*"
[152] For a comprehensive discussion of the effect of the discount rate, CDR and the ignoring of climate damage by IAMs on model results: the expert statement of Dr Van Beek, Exhibit MD-567, section 5. See also the expert statement of Prof. Rogelj, Exhibit MD-566, pp. 5 to 14.

92. Because of all of the above-mentioned risks, this is particularly problematic. In addition to the serious and possibly irreversible consequences that could arise due to overshoot, a gigantic quantity of negative CO_2 emissions is needed to bring the temperature back to the 'desired' level (after reaching net zero). For a decrease of 0.1°C, according to best estimates 220 (with a bandwidth between 160-370) GtCO2 in net negative emissions are needed.[153]

93. Based on this estimate, for every 0.1°C temperature drop, more than 5.5 years of current annual CO_2 emissions would have to be removed from the atmosphere and be permanently stored. By way of comparison: in 2022, 2 Mt in CO_2 was removed from the energy sector.[154] This is 0.002 Gt CO2. Removals in the land sector amount to approximately 2 Gt per year at present.[155]

94. An overshoot therefore asks for "*massive deployment*" of CDR[156], but CDR is not yet available at scale and it is uncertain whether CDR will become available at the required scale and in time. The ecosystems that can store CO_2 are, moreover, very vulnerable and come under greater pressure with every increase in warming.[157] In addition, the scaling up of CDR is "*tightly limited by techno-economic, social, political, institutional and sustainability constraints.*"[158]

95. Two problems come on top of this. Firstly, even modelled 1.5°C scenarios show a 50% chance that warming at the end of this century will come to more than 1.5°C (and a 10% chance that warming will even exceed 2°C).[159] Aside from the fact that in many cases an overshoot has already been built in, these scenarios thus also present a significant chance of a(n) (even) bigger overshoot (and ditto increase in dependency on CDR).

96. Secondly, there is still uncertainty about the possibility of 'turning the thermostat back': "*there remains large uncertainty about a potential asymmetry between the warming response to CO2 emissions and the cooling response to net negative CO2 emissions (Zickfeld et al. 2021). It was also shown that warming can adversely affect the efficacy of carbon dioxide removal measures and hence the ability to achieve net negative CO2 emissions (Boysen et al. 2016).*"[160]

97. In view of all of the foregoing, it is clear that leaning on CDR must be avoided as much as possible.[161]

98. The OECD report rightly concludes that the need to avoid overshoot – partly in connection with the need to limit the risk of passing tipping points – results in a limitation with regard to the reduction pathways that can be chosen: "*overshoot, however, depending on its extent and duration, could still result in crossing irreversible climate tipping points [...] The existence of climate system tipping points limits therefore the number and the shape of emissions pathways towards*

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[153] Exhibit MD-360, pp. 3-77. See also Exhibit MD-495A, p. 87.
[154] Exhibit MD-526B, p. 280. See also Exhibit MD-523, p. XXVI: "*Direct removals through novel CDR methods [...] are currently miniscule at 0.002 GtCO2 annually*."
[155] Exhibit MD-523, p. XXVI and p. 51. This involves removals brought about by humans by, e.g., planting trees. As explained above, the land sector as a whole is a source of emissions.
[156] Exhibit MD-360, pp. 3-77.
[157] See, inter alia, Exhibit MD-347, p. 56 (TS. C. 1.4), Exhibit MD-477, p. 9 (B. 1. 2).
[158] Exhibit MD-360, pp. 3-77.
[159] Exhibit MD-566, p. 13, para. 44(c).
[160] Exhibit MD-360, pp. 3-76. See also Summons, para. 762 with a further explanation of this point.
[161] See also Exhibit MD-516, Grant et al, Joule (2021), 'The policy implications of an uncertain carbon dioxide removal potential', p. 2601 "*Given deep uncertainty around the feasible potential for CDR, scientists, civil society and policymakers should push for maximum climate action in the 2020s, rather than betting on highly uncertain CDR resources*." And Exhibit MD-515B, Anderson et al, Nature Reviews (2023), 'Controversies of carbon dioxide removal', p. 6.

1.5°C […]"[162] and that "*the well-known argument that delayed emissions reductions can potentially be compensated by negative emissions during the latter part of the century is no longer valid*."[163]

99. According to the state of the best available climate science, including (i) the rapidly shrinking carbon budget, (ii) the increasing risks, including the increasing risk of passing tipping points, (iii) the increasing damage and losses, (iv) the limiting of the options for adaptation and sustainable development, (v) the limitations in the modelling relating to the additional danger of positive feedback loops and (vi) the risks and limitations of CDR, it is evident that there is a need to prevent overshoot. If this cannot be prevented, both the extent and the duration of overshoot must be limited as much as possible.

3 Update on conduct and (announced) Shell policy

3.1 Introduction

100. In this case, the best available climate science, including the above extremely concerning developments, serve as an important starting point for the forming of Shell's duty of care. In the following update Milieudefensie et al. provides an overview of the communications and conduct of Shell in 2022 and 2023, as well as of Shell's (intended) policy changes. This update shows that Shell is (still) fully focused on a large-scale lock-in of oil and gas.

3.2 Investments, policy and conduct in 2022

101. In the statement of defence on appeal, a great deal of attention was paid to the policy that Shell has been following since 2021, that it calls "Powering Progress". Milieudefensie et al. has explained that this strategy is far removed from what may be expected of Shell based on the reduction obligation and that there is therefore a breach, or a threatened breach of the legal obligation to which Shell is subject.

102. As is known, 2022 was the year in which Shell, empowered by the gas crisis that in part arose as a result of the war in Ukraine, achieved the highest profit in its history. The net profit doubled compared to 2021, to USD 39.9 billion.[164] Shell's turnover was USD 386.2 billion.[165]

103. This high profit was used to a significant degree to reward the company's own shareholders. Shell paid its shareholders USD 25.8 billion (compared to USD 9 billion in 2020 and 2021).[166] USD 18.4 billion of that amount consisted of the purchase of the company's own shares.[167]

104. In the statement of defence on appeal, Milieudefensie et al. explained that Shell's policy until at least 2030 provides for large-scale investments in oil and gas. In the Energy Transition Progress Report over 2022 it can be read that Shell significantly increased its capital investments in oil and gas compared to 2021, by USD 16.7 billion in capital investments:

"*We invested $4.2 billion in liquefied natural gas (LNG) as well as gas and power marketing and trading, an increase of 17% compared with the previous year. […] We also increased our investments in oil production and oil products by 30% to $12.5 billion. This includes investments of*

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[162] Exhibit MD-507, p. 60 and on that same page: "*Rapid cuts in emissions now are made all the more necessary by the increasing evidence that some tipping elements may be triggered at lower levels of warming, increasing the urgency of meeting the 1.5°C target with limited or no overshoot.*"

[163] Exhibit MD-507, pp. 66-67.

[164] Exhibit MD-534A, p. 29. These are the 'Adjusted Earnings'

[165] Exhibit MD-534A, p. 238.

[166] Exhibit MD-534A, p. 8: "*total shareholder distributions amounted to $ 25.8 billion*". See p. 365 for the information about 2020 and 2021.

[167] Exhibit MD-534A, p. 8 and p. 365.

$8.1 billion in our Upstream business, helping maintain our assets and make up for the natural decline in oil and gas production."[168]

105. In addition to large-scale investments in new oil and gas fields in its current portfolio, Shell is, moreover, continuing to invest substantially in frontier exploration: the search for new, still undiscovered fields in countries where no fossil fuel production is taking place yet.[169] Urgewald, an NGO that together with 50 partners maintains a database about the activities of 1623 oil and gas companies across the world, puts Shell in 7th place on the list of the biggest investors in exploration in the world.[170]

106. Milieudefensie et al. furthermore explained in the statement of defence on appeal that Shell's investments in alternative sustainable energy sources are much lower, extraordinarily so.[171] First and foremost, reducing emissions stands or falls with a reduction in the sale of oil and gas products. Shell's strategy provides, however, for the retention and even growth of its current oil and gas activities (with a slight shift from oil to gas). Shell's (modest) investments in "*low-carbon energy solutions*" are merely supplemental, and used by Shell to 'dilute' the average emissions intensity of its product portfolio.[172]

107. Of its total capital investments of USD 24.8 billion, in 2022 Shell invested USD 3.5 billion in its Renewables and Energy Solutions business (compared to 2.4 billion in 2021) and USD 0.8 billion in other "*low-carbon energy solutions*".[173] This is including acquisition of existing companies. By "*low-carbon energy products*" Shell means the products with an "*average carbon intensity that is lower than conventional hydrocarbon products, assessed on a lifecycle basis.*" In 2022, Shell's Renewables & Energy Solutions business included "*marketing and trading of power and pipeline gas*", "*carbon credits*", "*nature-based projects that avoid or reduce carbon emissions*" and "*development of commercial carbon capture and storage hubs*".[174] A part of the investments which are labelled for the public under this "sustainable" branch of Shell simply go to gas activities and the marketing and trading of (fossil generated) electricity.

108. Shell reports that its Scope 1 and 2 emissions in 2022 were 30% lower than in 2016.[175] A large part of this was brought about, however, by means of divestments, including the sale of its share in the Permian Basin in 2021. In 2022, Shell sold two refineries, among other things.[176] The GHG Protocol and the Scope 3 Standard forming part thereof prescribe, however, that companies with these kinds of structural changes must recalculate their base year with retroactive effect, precisely to prevent these kinds of situations, in which emissions are only transferred instead of reduced: "*Structural changes trigger recalculation because they merely transfer emissions from one company to another without any change in emissions released to the atmosphere (e.g., an acquisition or divestment only transfers existing GHG emissions from one company's inventory to another).*"[177] Milieudefensie et al. has concluded that Shell did not do so. Shell thus in part not so

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[168] Exhibit S-163, p. 25.
[169] Exhibit MD-534A, p. 388.
[170] Exhibit MD-550, p. 2.
[171] Statement of Defence on Appeal, paras. 689 to 692.
[172] Statement of Defence on Appeal, paras. 652 to 664. See Statement of Defence on Appeal, para. 653, where former CEO Ben van Beurden is quoted: "*We are diluting our carbon intensity by adding low-carbon products to our existing portfolio.*" See also Exhibit S-163, in which Shell explains the dilution over 2022: "*The decrease in Shell's net carbon intensity in 2022 was primarily due to an increased proportion of renewable power and corresponding reduction in the carbon intensity of our power sales. Shell's 2022 net carbon intensity includes 4.1 million tonnes of carbon credits, compared with 5.1 million tonnes which were included in Shell's 2021 net carbon intensity.*"
[173] MD-534A, p. 364 for the capital investments in Renewable & Energy Solutions (R&ES) and Exhibit S-163, p. 25 for total investments in "*low-carbon energy solutions*" of USD 4.3 billion.
[174] Exhibit S-163, p. 24.
[175] Exhibit S-163, p. 10.
[176] Exhibit S-163, p. 11.
[177] Exhibit RK-15, p. 35 and Exhibit RK-19, p. 104. See also Exhibit MD-573A, p. 11.

much reduced Scope 1 and 2 emissions (and associated Scope 3 emissions), but sold off assets (and consequently emissions) to other companies. This can hardly be deemed acting sustainably, nor does it align with the GHG Protocol used by Shell.

109. In addition, Shell itself has indicated that its Scope 1 and 2 emissions will increase in the coming years (emphasis added by legal counsel):

> "*The actions we will take to achieve our target will depend on the evolution of our asset portfolio and the continued development of technologies which reduce carbon emissions. Following divestment activity in 2022, we expect that on a net portfolio basis, new investments across our portfolio will increase our Scope 1 and 2 emissions between 2023 and 2030 and that they will exceed reductions associated with planned divestments and natural decline. […] Subsequent reductions in our emissions are reflected in the mechanisms outlined below and reflect an expected path to meeting our target in 2030.*"[178]

110. As Milieudefensie et al. understands it, Shell is asserting that new investments in, inter alia, oil and gas production will cause Shell's Scope 1 and 2 emissions to rise. Shell wants to achieve its 50% target by 2030 by means of efficiency improvements, use of renewable energy for the production of fossil fuels, CCS and carbon credits, but – as will also be shown in the following – not by reducing its production of fossil fuels.[179] It must furthermore be noted that Shell is also participating in oil and gas projects which are not under its operational control. In such case Shell does not report emissions associated with that production as Scope 1 and 2 emissions, but as Scope 3 emissions (as purchased goods and services and use of sold third party products).[180]

111. It has been explained in the statement of defence on appeal that Shell only has a target to reduce its Scope 1 and 2 emissions by 2030 by 50% relative to 2016 (that is 48% relative to 2019) and that said target only relates to 5% of its total emissions.[181] For the other 95%, Shell has no target to reduce its total emissions by 2030 in an absolute sense. Shell's total reported Co_2e emissions did fall in the past few years, by approximately 24.5% relative to 2019.[182] In its own words, Shell has sold less oil and gas in the past few years, partly as a result of the pandemic and by simply selling oil and gas activities to third parties. Shell's policy, moreover, provides no guarantee whatsoever of further or permanent emission reductions, as will be discussed below.

3.3 Investments, policy and future plans from 2023

112. Wael Sawan started as Shell's new top man on 1 January 2023. Shell has made far-reaching changes since that time. At a widely-announced Capital Markets Day in June 2023, Shell announced a number of plans that show that Shell will further expand its fossil fuel activities. "*Shell pivots back to oil*" and "*U-turning on climate pledges*", read the headlines of Reuters and Euronews Green.[183]

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[178] Exhibit S-163, p. 10.

[179] See also Statement of Defence on Appeal, section 6.2.5.

[180] See also Statement of Defence on Appeal, paras. 837: Shell's "*target for Scope 1 and 2 emissions is based on a demarcation on the basis of operational control.*" Exhibit MD-534A, p. 55 provides an overview of activities in oil and gas production, including indicating where Shell has operational control, with the following supplementary remark: "*In several countries where "Shell operator" is indicated, Shell is the operator of some but not all exploration and/or production ventures.*" The Scope 1 and 2 emissions from projects in which Shell participates, but does not have operational control, fall under Scope 3, category 1 (purchased goods and services), as can be seen in Exhibit MD-534C.

[181] In the Statement of Defence on Appeal (paras. 1103 et seq.) it was explained that Milieudefensie et al. retains an interest in the order being awarded, including with regard to these Scope 1 and 2 emissions, because this "target" of Shell comes with all kinds of reservations and Shell can reverse these at any time. It would not be the first time that Shell has changed a policy intention.

[182] Exhibit MD-534A, p. 97. Shell reports 1,232 Mt in Scope 1, 2 and 3 emissions over 2022. In 2019 the figure was 1,631 Mt.

[183] Exhibits MD-536B and MD-536C.

113. Firstly, there are cuts in the capital investments and costs and there is a "*ruthless focus on performance, discipline and simplification*". This is to be able to increase the dividends for shareholders, from 20-30% to 30-40% of the generated cash flows.[184] Shell even exceeded this in 2023, and paid out 42%, an amount totalling USD 23 billion.[185]

114. Secondly, there are considerable investments in oil and gas, with a focus on the growth of LNG. "*We are absolutely committed to our world-class Upstream and Integrated Gas businesses […]*". Shell expects to invest no less than USD 40 billion in these oil and gas activities between 2023 and 2025 and in total USD 100 billion up to 2030: "*Total production will grow from 2025…given our confidence in our portfolio and capabilities.*"[186] The already announced growth strategy for LNG (7 million tons a year in extra capacity[187]) will be further adjusted upward: "*We are the world leader in LNG… […] And we are growing that portfolio even more…. with around 11 million tonnes per year of new LNG capacity under construction, which will come on stream in the second half of the decade… that is almost a third of our current LNG portfolio*."[188] Shell's own LNG capacity is therefore growing by almost one-third in the second half of the 2020s. Shell also wants to purchase more LNG.[189] This means that Shell – in addition to increasing its own production capacity – will purchase more LNG from other producers and will put this on the market through its distribution channels. Up to 2030, Shell wants to have the sale of LNG grow by 20-30%: "*We see continued strong demand for LNG in the medium term… and expect to grow our LNG term sales by 20-30% by 2030.*"[190]

115. As background information: even according to the STEPS scenario – the IEA scenario that assumes that government policy remains the same – there is only a (very) limited growth in the demand for gas: "*In the STEPS, natural gas demand growth between 2022 and 2030 is much lower than the 2.2% average rate of growth seen between 2010 and 2021.*"[191] The planned LNG capacity – this is the infrastructure for making fossil fuel gas liquid – is, with an unaltered government policy, more than sufficient to supply the market with LNG until at least 2040.[192] With this Shell is actively working toward a growth that cannot be reconciled with the STEPS scenario, let alone with the decrease that is necessary to remain under 1.5°C warming. Under the APS scenario of the IEA (announced pledges), the demand for gas will fall by 7% in 2030, and under the NZE scenario of the IEA, demand will drop even more quickly: "*In the NZE scenario, demand falls by more than 2% per year from 2022 to 2030, and by nearly 8% per year between 2030 and 2040*."[193] In all IEA scenarios the demand for all fossil fuels will peak this decade.[194] Shell, however, is clinging to its fossil fuel business model and is fully geared to a coal-to-gas switch, to effect a long-term lock-in of gas infrastructure: "*we will work together with our customers to displace high-carbon energy sources such as coal with cleaner alternatives such as gas*."[195] Once again: this cannot be reconciled with any scenario, and certainly not with a scenario in which global warming can still be limited to

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[184] Exhibit MD-536A, Shell, Capital Markets Day, 14 June 2023, slides with prepared remarks, pp. 4 and 9.

[185] Exhibit S-250, Shell plc, 1 February 2024, 'Fourth quarter and full year 2023 results: Delivering strong results and shareholder distributions', p. 3. It says there that Shell's operational cash flows (CFFO) come to USD 54 billion and that 42% of the CFFO was paid out to shareholders. Shell also announced a dividend increase, as well as a new programme to purchase Shell's own shares.

[186] Exhibit MD-536A, pp. 9 and 23. On the slide on p. 14 Shell states to have approximately USD 13 billion a year to spend up to and including 2030. Eight years (2023-2030) times USD 13 billion is USD 104 billion.

[187] Statement of Defence on Appeal, para. 679.

[188] Exhibit MD-536A, p. 22.

[189] Exhibit MD-536A, p. 26: "*Beyond our own production, we also add scale and flexibility to our LNG portfolio by buying LNG from others. […] We can use our scale and balance sheet to enter contracts in the early stages of projects… and to obtain attractive terms*."

[190] Exhibit MD-536A, p. 23.

[191] Exhibit MD-526B, 136.

[192] Exhibit MD-526B, 136.

[193] Exhibit MD-526B, 78.

[194] Exhibit MD-526B, 18.

[195] Exhibit MD-536A, p. 17.

1.5°C. In this respect it is once again pointed out that the emissions from existing oil and gas infrastructure (i.e. even without counting coal) already well exceed the still remaining carbon budget for 1.5°C.[196]

116. Thirdly, the announced production reduction for oil has been abandoned. Shell believes that it has already achieved that reduction, thanks to a few "*targeted divestments*", including the sale of its share in the American Permian Basin to ConocoPhilips in 2021.[197] The "*gradual decline*" of 1-2%[198] announced in March 2021 was apparently reached with retroactive effect a few months later. Shell either already knew at the time that it would use the sale to achieve its policy objective, or it used the sale afterwards as an excuse to let go of its policy objective. Whatever the case may be, Shell asserts that it expects it will have to keep its oil production at more or less the current level of 1.4 million barrels a day until 2030.[199]

117. Fourthly, Shell distances itself, sometimes rather subtly, from certain 'low-carbon' activities or objectives which it previously announced in relation to its business strategy:
    - Shell wanted to sell twice as much electricity and provide the equivalent of 50 million households with renewable electricity,[200] but decided to sell its Energy Retail branch and now wants to be more selective with investments in renewable electricity;[201]
    - Shell wanted to expand its network of electric charging stations to 2.5 million in 2030. This ambition apparently no longer exists, as Shell is now only striving for 200,000 public charging stations.[202] The specific ambition to expand the network of private charging stations to 2.3 million by 2030 appears to have been abandoned. By way of comparison: in 2022 Shell had 112,000 private charging stations worldwide;[203]
    - Shell cancelled various projects in offshore wind, hydrogen and biofuels;[204]
    - Shell cut 200 jobs in the Renewables & Energy Solutions division, and another 130 extra jobs might be cut, which would total 15% of the workforce in that branch.[205]

118. Fifthly, Shell is keeping its investments in so-called "*low-carbon energy solutions*"[206], despite the record profits booked – in 2023 Shell earned the second highest profit in its history, USD 28.3 billion[207] – at approximately the same level. This relates to USD 10-15 billion in capital investments between 2023 and 2025 in "*low-carbon energy solutions*", which comes down to 3.3 – 5 billion per year.[208] In the past few years, a considerable part of those expenses consisted of purchase prices for the acquisition of existing companies that Shell added to its portfolio.

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[196] Exhibit MD-523, p. XXIII.
[197] Exhibit MD-536A, p. 23. See also Exhibit MD-536B, Euronews Green, 15 June 2023, 'Shell joins BP and Total in U-turning on climate pledges 'to reward shareholders', pp.1-2: "*The oil and gas giant claims it has already hit its 2030 target, because it sold its interest in a Texan oilfield in 2021.*"
[198] Exhibit MD-378, p. 20: "*Our oil production peaked in 2019 and we expect that it will gradually decline by 1-2% a year through to 2030.*"
[199] Exhibit MD-536A, p. 23: "*We have achieved that reduction earlier than expected through targeted divestments… and now expect to maintain our liquids production at approximately 1.4 million barrels of oil equivalent a day to the end of the decade.*"
[200] Exhibit MD-378, p. 5.
[201] Exhibit MD-536A, p. 8 ("*We will selectively invest in renewable generation, and mostly supplement with electrons from others.*") and p. 37. See also Exhibit MD-536D, Financial Times 5 November 2023, 'Shell boss backs 'leaner' operation in defending renewables strategy shift', p. 2.
[202] Exhibit MD-536A, p. 34.
[203] Exhibit S-172, p. 35.
[204] Exhibit MD-536C, Reuters 9 June 2023, 'Exclusive: Shell pivots back to oil to win over investors', p. 2.
[205] Exhibit MD-536D, pp. 1-3.
[206] Milieudefensie et al. understands from Shell's report (Exhibit S-163, p. 25) that this covers the Renewables and Energy Solutions business and part of Shell's Marketing business (in which Shell's electric charging station network has been placed).
[207] Exhibit S-250, p. 6.
[208] Exhibit MD-536A, p. 20.

119. In the past few months, various managers have left Shell's sustainable business out of frustration.[209] These employees know better than anyone what Shell's internal company culture is and what course Shell wishes to follow, at the expense of humans and the environment. Shell's board of directors leaves no doubt about this in its external communication: "*At the heart of everything that we do will be a ruthless approach to capital allocation and a singular focus on creating long-term value […] We will make every dollar count, be unemotional with our spend, and deliver performance*", said the CFO.[210]

120. Shell's course was a reason for various pension funds to sell their shares in Shell. In 2021, both ABP and the PME pension fund announced they were leaving, because talks were showing little result.[211] In 2022, the pension fund for the hospitality and catering sector stopped all fossil fuel investments[212], followed last month by the second largest pension fund in the Netherlands: the pension fund for the health care sector, Pensioenfonds Zorg en Welzijn (PFZW). PFZW sold 97% of its stakes in oil and gas companies, including the stakes in Shell and BP, after the board of directors had exerted pressure for two years to increase the climate efforts of said companies. CEO Joanne Kellerman calls the lack of leadership of Shell and others "*disillusioning and disappointing*."[213]

121. Shell's communications and the above developments show that for the foreseeable future Shell is geared to maintaining and growing its fossil fuel business activities. Research of Oil Change International ("**OCI**") based on data from Rystad confirms that since the Judgment, Shell has approved no fewer than 20 new oil and gas projects.[214] In addition, Shell has an interest in 813 undeveloped oil and gas projects. In volume of oil and gas in undeveloped assets, this concerns a growth of a good 24% compared to the analysis that OCI made in 2022 (from 11.9 billion barrels of oil equivalent (boe) to 14.7 billion boe).[215] If Shell were to fully exploit its existing and still undeveloped oil and gas fields, according to OCI's calculations Shell would consequently emit 11.9 gigatons of CO_2.[216] This is equal to 31 times Shell's production in 2022. If Shell were to only exploit its existing oil and gas fields (and thus not approve any new fields), this still comes to 17 times Shell's annual production in 2022.[217] According to the OCI research, 60% of all of Shell's investments in oil and gas between 2024 and 2030 will be spent on new projects. This concerns (i) projects for which Shell had not yet made a final investment decision as of 1 January 2024 (good for 43% of the total expected investments) and (ii) oil and gas fields that are under construction but are not yet in production (good for 17% of the total expected investments).[218]

122. There can be no doubt that Shell's plans are miles removed from what, according to the best available science, is required to limit the biggest dangers of climate change as much as possible. Almost three years ago the District Court left no room for doubt that Shell's duty of care calls for urgent and immediate emission reductions, whereby the Shell group's energy package will have to be modified.[219] According to the District Court, immediate and far-reaching measures and

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[209] Exhibit MD-536D, pp. 1-3.
[210] Exhibit MD-536A, p. 13.
[211] Exhibit MD-556B, pp. 3 and 4. See also Exhibit MD-556C, p. 2 where it is described that Shell and ExxonMobil were excluded after lengthy engagement had yielded no results.
[212] Exhibit MD-556C, pp. 3 and 4.
[213] Exhibit MD-573B, Het Financieele Dagblad, 8 February 2024, 'Ook pensioenfonds voor de zorg stapt uit Shell en BP' [Health care pension fund also divests from Shell and BP'].
[214] Exhibit MD-573A, Oil Change International, March 2024, Shell vs the Climate: Expanding Oil and Gas, Fueling the Climate Crisis, p. 4.
[215] Exhibit MD-573A, pp. 15-16. See also Statement of Defence on Appeal, paras. 686 et seq., with reference to Exhibit MD-396.
[216] And this only concerns the emissions from Shell's own production. The emissions that are connected with Shell's other activities are not yet included.
[217] Exhibit MD-573A, pp. 15-16.
[218] Exhibit MD-573A, p. 23.
[219] Judgment, para. 4.4.53.

financial sacrifices could be demanded on the part of Shell as of 2021.[220] The District Court explicitly considered that this should have consequences for new investments and explorations.[221]

123. In light of the foregoing, the following statement by Shell in its Energy Transition Progress Report 2022 about the interpretation of the Judgment is absurd: "*We believe the actions we are taking to deliver our energy transition strategy are consistent with the court ruling and its end of 2030 timeline.*"[222] As Shell knows only too well, the dictum of a judgment must be interpreted in accordance with established case law in the light of the considerations in the body of the judgment. It is clear that Shell has been ignoring this up to now.[223]

124. A few days ago, on 14 March 2024, Shell published an update of its Energy Transition Strategy.[224] This again shows that Shell is fully focused on a fossil fuel future. The goal of reducing the average intensity of its energy products in 2030 by 20% has been adjusted downward, to 15-20%.[225] The target of reducing that intensity by 45% in 2035 has been completely abandoned.[226] The end point of net zero in 2050 remains, but this end point is meaningless without a concrete plan to work toward and that provides for the necessary immediate emission reductions.

125. The update of its strategy shows that Shell reduced the intensity of its energy products in the past year by adding renewable electricity to its portfolio (partly through the use of Renewable Energy Certificates) and through the use of carbon credits, but not by selling fewer fossil fuel products.[227] Aside from the fact that Shell's goals were already inadequate in terms of providing absolute emission reductions in line with climate science, with this policy update Shell once again shows that its promises are worthless and that it has no intention, in this critical decade, of making a proportional contribution to mitigating the unprecedented dangers of climate change for humans and the environment of its own volition. With these actions Shell is seriously undermining the global climate goal. It calls to mind 2009, when Shell shut down the Renewables division in order to focus on very polluting unconventional fossil fuel activities, because this was more profitable.[228]

126. Shell will itself undoubtedly place the emphasis on its new "ambition" of reducing the Scope 3 emissions that are related to the use of oil products by 15-20% in 2030 relative to 2021. This concerns the use of petrol, diesel, kerosene and fuel oil in the transport sector.[229] Firstly, this is an ambition, and not a target.[230] When it no longer suits Shell, it will just drop this ambition. Secondly, this ambition primarily reflects Shell's own views on "*attractive growth opportunities*" which it is happy to take advantage of.[231] This concerns, inter alia, the focus on more charging stations for electric vehicles, where enormous growth is already visible, and the focus on biofuels.

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[220] Judgment, paras. 4.4.53, 4.4.54 and 4.5.7.
[221] Judgment, paras. 4.4.39 and 4.5.2.
[222] Exhibit S-163, p. 31. See for an earlier explanation, the Statement of Defence on Appeal, section 7.4.
[223] See also Statement of Appeal on Defence, section 7.4.
[224] Shell Energy Transition Strategy 2024, available on https://www.shell.com/sustainability/our-climate-target/shell-energy-transition-strategy/_jcr_content/root/main/section/promo_copy_copy/links/item0.stream/1710386815551/26357bbb7c06090d26fe803a7da5f23c637c8a56/shell-energy-transition-strategy-2024.pdf.
[225] Shell Energy Transition Strategy 2024, pp. 49 and 50.
[226] Shell Energy Transition Strategy 2024, p. 49.
[227] Shell Energy Transition Strategy, p. 50: "*The decrease in Shell's NCI in 2023 was mainly achieved through a reduction in the average intensity of power sold and the use of carbon credits*." And p. 41: "*In 2023, Shell's net carbon intensity (NCI) accounted for 20 million carbon credits, of which 4 million were linked to the sale of energy products.*"
[228] Summons, paras. 576 to 585 and paras. 623 to 625.
[229] Shell Energy Transition Strategy 2024, p. 27.
[230] In any event, Shell's goals are conditional, as is evident, inter alia, from the extensive disclaimer that Shell applies with regard to all its plans, see Statement of Defence on Appeal, section 6.2.9.
[231] Shell Energy Transition Strategy, p. 27.

127. Above all, Shell is focusing on a considerable growth in the sale of LNG and natural gas, so that a reduction of Scope 3 emissions that are related to the use of oil products will be nullified by a growth in CO_2 emissions from the production and sale of gas. There is a good reason why Shell adjusted its goal to reduce the average carbon intensity of its energy products for 2030 downward and abandoned it completely for 2035. As already discussed above, with its policy Shell is gearing toward a growth in the global consumption of natural gas (including LNG) that cannot even be reconciled with the highest emission scenarios of the IEA, let alone with a scenario in which global warming is still limited to 1.5°C. With this immutable belief in a fossil fuel future, Shell is now trying to create its own reality, while at the same time praising its policy for being in line with the Paris Agreement. It is this destructive course that stands in the way of the global climate approach and against which Milieudefensie et al. seeks protection.

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