

District Court of The Hague
Hearings on 1, 3, 15 and 17 December 2020
Case number: C/09/571932 19/379

PLEADING NOTES:

SCIENCE

15 DECEMBER 2020

of *mr. J. de Bie Leuveling Tjeenk, mr. N.H.*
van den Biggelaar and *mr. D. Horeman*

in the case of:

**MILIEUDEFENSIE ET AL. versus
ROYAL DUTCH SHELL PLC**

1 CORRECT FACTS REGARDING THE SCIENCE

1.1 Introduction

1. In its Statement of Defence, RDS pointed out that Milieudéfensie et al. often misrepresent the IPCC's findings, and more specifically take positions that do not properly reflect the scientific consensus as evidenced by IPCC reports.¹ That is problematic because they make science the focus of their case. For example, in paragraph 37 of the summons, they refer to "the best available science".
2. Milieudéfensie et al. did not remedy its defective representation afterwards, but did rely in their amendment of claim on what they call the "best available (UN) climate science", without any explanation. This must refer to the IPCC reports, because the UN itself does not

¹ Statement of Defence, margin numbers 231-232.

engage in science and, for the rest, the IPCC reports on existing science and does not itself perform new research.

3. In addition to this, Milieudéfense et al. changed course in two respects during the oral arguments. Firstly, they have now explicitly added as an alternative basis for their claims the interests of only Dutch residents instead of the world population as a whole. Secondly, they emphasised a few factual findings in the decisions of the Court of Appeal and the Supreme Court in *Urgenda*, which they claim to quote "because these are also the circumstances on which the individual claimants can and may rely". Milieudéfense et al. also make it clear that they believe that they can suffice with this, "without them being expected to assert more".²
4. Well, Milieudéfense et al. have not submitted sufficient assertions. Also in view of the far-reaching measures being sought, Milieudéfense et al. must be required to clarify the exact risk they are raising, and why that risk justifies the measures being sought. If such far-reaching and drastic measures are being required of RDS, the claimants must, at the very least, adequately explain - and prove - what risk is being combated with these measures and that the measures sought will be effective in doing so. First and foremost, Milieudéfense et al. even fail to clarify what risk specifically Shell creates, and they also do not demonstrate that the measures sought will be effective in addressing that risk. We will discuss that on the fourth day.
5. In this part of our oral arguments, we will discuss Milieudéfense et al.'s general argument about the risk of climate change. As I just mentioned, Milieudéfense et al. evidently, but wrongly, believe that they can suffice with this. But there is more. Where a claimant in proceedings such as these must be required to make that risk crystal clear, it is evident from further consideration that Milieudéfense et al. take positions that cannot be reconciled with the sources they cite. They also cite outdated sources, without mentioning more recent insights. In this way, Milieudéfense et al. paint a one-dimensional picture of a complex problem. And they are actually asking the court

² Written arguments 2 Milieudéfense et al., margin number 107.

to intervene in depth and anticipate the shaping of the energy transition by policymakers. But it is unacceptable in that case, of course, to oversimplify what is actually a complex situation faced by policymakers. As Milieudefensie et al. did not improve their faulty assertions themselves, this prompts RDS to give an explanation. We will discuss the following points in succession.

- Why is the correct scientific basis important (part 1.2)?
- Examples of misrepresentation of the scientific sources by Milieudefensie et al., first in general (part 1.3) and then where the Netherlands is concerned (part 1.4).

6. Before we get to that, RDS would like to say that the importance of tackling climate change is beyond doubt. It also takes measures that support and anticipate the transition. RDS started with this, both in the Statement of Defence and during the hearing days. However, because Milieudefensie et al. have opted to broach this far-reaching subject matter with a claim at law, it must be critically assessed whether their arguments regarding the general risks make any sense. That is what we are going to do now.

1.2 A correct scientific basis is important for a judgment if the court should believe that those facts are necessary for the substantiation of the decision

7. The IPCC performs a Herculean task. Its task is to chart out a very complex scientific issue. Its procedures describe that the objective is to inform about "*the current state of knowledge about one of the most complex and important of all topics - climate change science. The scientific community still has much more to learn about climate change. But the scientific community and the world can count on the IPCC to provide an accurate picture of what is known and what is not known*". The IPCC's role is "*to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understand the scientific basis of*

human-induced climate change, its potential impacts and options for adaptation and mitigation".³

8. The IPCC does so objectively in order to provide a good basis for policy choices. After all, its objective is "*to provide policy relevant but not policy-prescriptive information*".⁴ The IPCC therefore avoids terms such as "dangerous" because this entails a value judgement that IPCC considers beyond its scientific remit.⁵
9. That way of working is necessary because important decisions must have a correct factual basis. In the words of the IPCC: "*[a] careful assessment is a powerful tool for transforming a huge body of science into the kind of knowledge that can support well-informed policy choices*".⁶ Milieudefensie et al. also acknowledge that no fewer than 195 countries use the science as reported by the IPCC to make policy choices.⁷
10. The policy questions faced by States in tackling climate change are not simple, nor is the science. The IPCC recognises exactly that, and therefore requires that accuracy of itself. If the court in a case like the present one even sees a role for itself in assessing the position of a private company in the midst of the energy transition, it must at the very least be a requirement that the scientific basis for that analysis be sound.
11. The IPCC Assessment Reports are of particular importance. Many hundreds of scientists have spent many years working on those. The Assessment Reports were drafted very extensively and with the utmost care and precision. The most recent Assessment Report is AR5 from 2014. RDS submitted the table of contents of that report to the proceedings in order to provide the District Court with insight into the degree of accuracy and the extensiveness of that analysis, which the parties have already submitted into the proceedings on important

³ Exhibit MD-125 and Statement of Defence, margin number 233.

⁴ Exhibit MD-125.

⁵ E.g. Exhibit MD-113, p. 12 at the top. See also, inter alia, Statement of Defence, margin number 234, with reference to Exhibit MD-138.

⁶ Exhibit MD-125.

⁷ Summons, margin no. 369.

aspects.⁸ Other special IPCC reports are drafted in a shorter period of time and are more limited, and are not put together with the same long-term, thorough and exhaustive review process as the Assessment Reports. The Synthesis Reports and the Summaries for Policymakers to the various reports are summaries, but do not offer the same degree of insight that the working groups in the Assessment Reports themselves do, and should not be taken out of that context.

12. If the District Court were to feel compelled to discuss in its opinion points that touch on the scientific basis for climate change, which, for the rest, RDS does not deem necessary in view of the many defences, it is very important that this opinion is factually correct. It must be alert to Milieudéfense et al.'s assertions that go beyond the scientific sources as reported by the IPCC. Given the great importance of the subject matter of this case, this is also important if the particular findings are not directly relevant to the decision because the claims are already to be rejected on other grounds as well. Milieudéfense et al. themselves have argued that, in their opinion, it is appropriate that a judgment be rendered with considerations that "*set an example [...] for courts in other countries,*" because "*the reasoning on which the award is based*" "*clarifies*" issues.⁹ Milieudéfense et al. themselves also invoke the *Urgenda* judgment.¹⁰ The fact that a comment about the need for scientific accuracy is not superfluous is, unfortunately, aptly illustrated by the fact that, in *Urgenda*, in fact, the courts were clearly not adequately informed by the parties to the proceedings. For example, a misrepresentation of scientific sources found its way into the court's opinion. We will come back to that later.
13. RDS therefore considers it important to point out to the District Court the lack of accuracy in assertions referred to by Milieudéfense et al. as the key points in its argument.

1.3 General points

14. Milieudéfense et al.'s assertions about general risks of climate change are rather broad and general. That is why RDS first focuses on a point

⁸ Exhibit RO-265, Overview of parts of the IPCC AR5 report submitted.

⁹ Written arguments 2 Milieudéfense et al., margin number 113.

¹⁰ Written arguments 2 Milieudéfense et al., margin numbers 89, 92 and 107.

that Milieudéfensie et al. themselves put first and which, according to them, deserves "special attention" (part 1.3.1). RDS will then explain, using an example, that, for the rest, Milieudéfensie et al. paint a one-sided picture by always explaining one side of the coin and not paying attention to ways of dealing with risks, so that their assertions are insufficient to establish that the risks are such that what is being sought can be required of RDS (part 1.3.2). We will then discuss what Milieudéfensie et al. put forward about Dutch residents (part 1.4).

1.3.1 "Tipping points"

15. In their argument, Milieudéfensie et al. present what they call "tipping points" as points that deserve "special attention," "*because they [refer] to the most comprehensive, drastic and abrupt dangers of climate change*".¹¹ According to them, these are abrupt and irreversible changes in the "climate system" itself.¹² And the problem then, still according to Milieudéfensie et al., is this: "*if such tipping points are reached, certain major consequences can become irreversible and feedback mechanisms can accelerate the climate change and possibly even make it uncontrollable*."¹³ According to the summons, the risk of these kinds of tipping points in the "climate system" is "*high to very high*," because this is reportedly evidenced by IPCC's AR5.¹⁴¹⁵ And Milieudéfensie et al. cite judgments regarding *Urgenda* in which it is assumed that, according to the IPCC, the risk of "*tipping points*" in the sense of "*abrupt climate change*" increases "*at a steepening rate*" in the event of a 1 to 2°C temperature increase compared to pre-industrial times, with reference to the IPCC's SR15 report.¹⁶
16. The problem now is that Milieudéfensie et al. misrepresent the scientific sources on both points.
- (a) The passage in AR5 in which, according to Milieudéfensie et al., the IPCC writes that the risks are "*high to very high*" with

¹¹ Summons, margin number 436.

¹² Summons, margin numbers 436-437.

¹³ Summons, margin number 437.

¹⁴ See the definition in the appendix to the Statement of Defence.

¹⁵ Summons, margin number 440.

¹⁶ See the definition in the appendix to the Statement of Defence.

regard to "tipping points" in the sense referred to by Milieudefensie et al. - i.e. drastic and abrupt changes in the "climate system" - does not, in reality, pertain to the tipping points as put forward by Milieudefensie et al. The IPCC does use the words "*high to very high risk*," but that pertains to an entirely different and broader category of "*serious, widespread and irreversible impacts*". It is also a qualification which is, at that point, linked by the IPCC to a hypothetical situation "*without additional mitigation efforts*" in which the temperature rises by 3.7-4.8°C above pre-industrial temperatures before the end of this century. The source therefore does not state what Milieudefensie et al. allege. Milieudefensie et al. therefore do not provide a basis for their assertion that the risks are, according to the IPCC, "*high to very high*" when it comes to drastic and abrupt changes in the "climate system" itself. And that is problematic, because it is one thing to note, as the IPCC does, that the risks of certain consequences are "*high to very high*" in the event of a very high temperature increase. But it is something different to say, as Milieudefensie et al. do, that this also applies to the risk of "tipping points" in the sense of drastic and abrupt climate changes. The IPCC does not say the latter.

- (b) In *Urgenda*, the Court of Appeal - and following suit from the Court of Appeal, the Supreme Court as well - was clearly not properly informed by the parties about what scientific reports show and do not show. They hold that it reportedly emerges from a passage in AR5 that, according to the IPCC, the risk of "tipping points" in the sense of (in the words of the Supreme Court) "*climate change, whereby the climate on earth or in areas on earth changes abruptly and drastically*" or (in the words of the Court of Appeal) "abrupt climate change" increases "*at a steepening rate*" in the event of a temperature increase of between 1 and 2°C. But that is not what that source says. The IPCC uses the term "tipping points" in many places to denote consequences that may arise for "*physical, ecological or social systems*". Contrary to what Milieudefensie et al. suggest, therefore, the term "*tipping points*" is not used by the IPCC for situations that change the "climate system" as

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such. And that is why it is important to determine to which category precisely the IPCC gives the qualifications mentioned by Milieudéfensie et al. And if the source text is then examined, it turns out that the Court of Appeal and the Supreme Court were put on the wrong track in *Urgenda* if they believe that the IPCC applies the "steepening rate" of risks to "climate change". The IPCC is not talking about this in the source text, but about the category of "physical and ecological systems", such as possible damage to coral. It is one thing to say that certain risks of damage to specific physical and ecological systems are increasing "at a steepening rate". However, the assertion that this also applies to the risk of "climate change" goes decidedly further.

We will examine the source text on both points.

17. It starts with the fact that Milieudéfensie et al. deliberately create uncertainty about terminology that the IPCC uses carefully. While the IPCC refers to "*abrupt and drastic changes in physical, ecological, or social systems*" and denotes these at a certain place as "*tipping points*," this is corrupted by Milieudéfensie et al. into abrupt and irreversible changes to the "climate system" itself. That is something quite different. One concerns changes in systems that are "physical" (such as oceans or the cryosphere), "ecological" (such as a forest), or social (such as a community on a small island). The other would concern change in the climate system itself, and that goes further.

Milieudéfensie et al.'s assertion in the summons (emphasis added, attorneys)	Source text (AR5, Exhibit MD-150, p. 1079)
<p>"436. Of the five reasons for concern, the fifth reason (the risks of 'large-scale singular events') deserves special attention because it refers to the most comprehensive, drastic and abrupt dangers of climate change. These are the so-called "<u>tipping points</u>" in the climate <u>system</u>:</p>	<p>"large-scale singular events (sometimes called "tipping points", or critical thresholds) are <u>abrupt and drastic changes in physical, ecological, or social systems</u> [...] Combined with widespread vulnerability and exposure, they pose key risks because of the potential</p>

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<p><i>'large-scale singular events (sometimes called "tipping points", or critical thresholds) are abrupt and drastic changes in physical, ecological, or social systems [...] Combined with widespread vulnerability and exposure, they pose key risks because of the potential magnitude of the consequences; the rate at which they would occur; and, depending on this rate, the limited ability of society to cope with them.'</i></p> <p>437. <u>With a tipping point, the IPCC indicates (see quote above) that a climate system undergoes an abrupt and irreversible change.</u> If such tipping points are reached, certain major consequences can become irreversible and feedback mechanisms can accelerate the climate change and possibly even make it uncontrollable."</p>	<p>magnitude of the consequences; the rate at which they would occur; and, depending on this rate, the limited ability of society to cope with them."</p>
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From that point onwards, Milieudéfensie et al. wrongly make it appear in the summons that by “tipping points”, the IPCC means abrupt and irreversible change in the climate system itself.

18. And then Milieudéfensie et al. continue their argument by making it seem, in a passage from AR5 cited by them, as if the IPCC is stating that the risk is “high to very high” as concerns the “tipping points” that Milieudéfensie et al. are referring to, the abrupt and reversible change of the "climate system" itself, therefore. That is not what it says. It is also a qualification which is, at that point, linked by the IPCC to a hypothetical situation "*without additional mitigation efforts*" in which the temperature rises by 3.7-4.8°C above pre-industrial temperatures before the end of this century.

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Milieudefensie et al.'s assertion in the summons (emphasis added, attorneys)	Source text (Exhibit MD-112, p. 77, highlight added by attorneys)
<p>"440. In the AR5 report, the IPCC concludes <u>that the risk of tipping points is high to very high</u> if we do not proceed to further reducing emissions:</p> <p style="padding-left: 40px;"><i>'Without additional mitigation efforts beyond those in place today, and even with adaptation, warming by the end of the 21st century will lead to high to very high risk of severe, widespread and irreversible impacts globally.'</i>"</p>	<p>Without additional mitigation efforts beyond those in place today, and even with adaptation, warming by the end of the 21st century will lead to high to very high risk of severe, widespread and irreversible impacts globally (high confidence) (Topic 2 and Figure 3.1a). Estimates of warming in 2100 without additional climate mitigation efforts are from 3.7°C to 4.8°C compared with pre-industrial levels (median climate response); the range is 2.5°C to 7.8°C when using the 5th to 95th percentile range of the median climate response (Figure 3.1). The risks associated with temperatures at or above 4°C include severe and widespread impacts on unique and threatened systems, substantial species extinction, large risks to global and regional food security, consequential constraints on common human activities, increased likelihood of triggering tipping points (critical thresholds) and limited potential for adaptation in some cases (high confidence). Some risks of climate change, such as risks to unique and threatened systems and risks associated with extreme weather events, are moderate to high at temperatures 1°C to 2°C above pre-industrial levels. {WGII SPM B-1, SPM C-2, WGIII SPM.3}</p>

Milieudefensie et al.'s assertion that "tipping points" that concern abrupt and irreversible impacts on the "climate system" itself are characterised by this degree of risk hangs in a vacuum, therefore, because it does not follow from the sources they cite.

19. And then Milieudefensie et al.'s reference to the decisions in Urgenda. In oral arguments, Milieudefensie et al. refer to the way in which "tipping points" are discussed in the *Urgenda* judgments. Milieudefensie et al. suggest that the point has already been decided in *Urgenda* and that none of the claimants is therefore required to elaborate on assertions. The problem with the way in which Milieudefensie et al. present the sources they cite is, in essence, that they make no distinction between situations where "tipping points" is used as a term for a wide range of consequences that can occur in

"*physical, ecological or social systems*", on the one hand, and cases in which the same term is used to denote change in the climate itself, on the other. We have just seen that (margin number 17). It has its consequences here as well. If the source text is referred to, it turns out that the Court of Appeal and the Supreme Court were put on the wrong track in *Urgenda* if they believe that the IPCC applies the "steepening rate" of risks to "climate change".

20. The IPCC talks in the source text about a broader category of consequences for "*physical and ecological systems*". The Synthesis Report to AR5 states on page 72 (emphasis added, attorneys)¹⁷:

5. **Large-scale singular events:** With increasing warming, some physical and ecological systems are at risk of abrupt and/or irreversible changes (see Section 2.4). Risks associated with such tipping points are moderate between 0 and 1°C additional warming, since there are signs that both warm-water coral reefs and Arctic ecosystems are already experiencing irreversible regime shifts (medium confidence). Risks increase at a steepening rate under an additional warming of 1 to 2°C and become high above 3°C, due to the potential for large and irreversible sea level rise from ice sheet loss. For sustained warming above some threshold greater than ~0.5°C additional warming (low confidence) but less than ~3.5°C (medium confidence), near-complete loss of the Greenland ice sheet would occur over a millennium or more, eventually contributing up to 7 m to global mean sea level rise.

21. And still Milieudefensie et al. cite the following in written arguments 2, and thus, in line with that judgment, make it seem as if the IPCC was referring to "abrupt climate change":

"106 [...] I quote the relevant passages from the Court of Appeal because these are also the circumstances on which the individual claimants can and may rely in order to request protection, without them being required to assert anything further.

107. The Court of Appeal describes the relevant consequences to which the conclusion refers as follows:

- *[...]*
- *As the warming continues further, the consequences not only increase in severity. Accumulation of CO₂ in the atmosphere can lead to the climate change process reaching a 'tipping point', which can result in abrupt climate change in response to which neither man nor*

¹⁷ Exhibit MD-112.

nature can take proper action. The risk of such ‘tipping points’ increases ‘at a steepening rate’ in the event of an increase in temperature of between 1 and 2°C (AR5 p. 72).” (emphasis extended with respect to the original, attorneys).

The Supreme Court also mentions these points from the Court of Appeal's judgment in paragraph 2 of its own judgment. It adds the following in paras. 4.2-4.4:

"4.2 The emission of greenhouse gas emissions, due in part to the combustion of fossil fuels which releases the greenhouse gas CO₂, results in an ever-increasing concentration of those gases in the atmosphere. As a result of this, the earth warms up. That warming has various harmful consequences. It can result locally in extreme heat, extreme drought, extreme precipitation or other extreme weather conditions. It also results in glacial ice and ice near the poles melting and the sea level consequently rising. Some of these consequences are already occurring. That warming can also result in climate change whereby the climate on earth or in areas on earth changes abruptly and drastically (known as ‘tipping points’). All of this leads to, among other things, considerable damage to ecosystems, which, for example, endangers food supply, causes loss of territory and habitats, and also damage to health and the loss of human lives.

4.3 In climate science, there has been a great deal of consensus for some time that global warming must be limited to a maximum of 2°C and that this means that the concentration of greenhouse gases in the atmosphere must remain limited to a maximum of 450 ppm. There is now the insight in climate science that safe warming is limited to a maximum of 1.5°C and that this means that the concentration of greenhouse gases in the atmosphere must remain limited to a maximum of 430 ppm. Above these concentrations, there is a serious risk that the consequences referred to above in 4.2 will occur on a large scale. For the sake of brevity, the materialisation of this risk will

be referred to below, as in the Court of Appeal's judgment, as dangerous climate change.

4.4 If there is insufficient reduction in greenhouse gas emissions, dangerous climate change cannot be ruled out in the foreseeable future. According to the IPCC's AR5 "Synthesis Report" from 2014, which is part of the AR5 report referred to above in 2.1 (12), there is a risk that the 'tipping points' mentioned above in 4.2 will already occur in the event of warming of between 1 and 2°C 'at a steepening rate'. (emphasis added, attorneys).

22. Here, too, Milieudefensie et al. do not substantiate their assertion that tipping points - in the sense they mean - are characterised by the degree of risk they mention. After all, that assertion is based on an incorrect interpretation of the cited source.
23. Incidentally, the fact that when discussing "tipping points", one must always consider which phenomena are being discussed is not surprising, because the IPCC looks at all sorts of aspects of climate change. It should be borne in mind that the IPCC's working groups also focus on different questions, working group I on "*The Physical Science Basis*" and working group II on "*Impacts, Adaptation and Vulnerability*".¹⁸ But what does AR5 indeed say about "tipping points" in the work of working group I that deals with *The Physical Science Basis*?¹⁹ In the detailed report, that working group discusses various elements in order to determine whether they satisfy the notion of "tipping point" as sudden and irreversible changes. That working group only characterises one of those points investigated as such a "tipping point" that would be both sudden and irreversible. That element is then assessed as "*very unlikely*," "*with high confidence*". See Exhibit MD-101, p. 1115 (emphasis added, attorneys):

¹⁸ Exhibit MD-124.

¹⁹ Regarding those working groups, see Exhibit MD-124.

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Table 12.4 | Components in the Earth system that have been proposed in the literature as potentially being susceptible to abrupt or irreversible change. Column 2 defines whether or not a potential change can be considered to be abrupt under the AR5 definition. Column 3 states whether or not the process is irreversible in the context of abrupt change, and also gives the typical recovery time scales. Column 4 provides an assessment, if possible, of the likelihood of occurrence of abrupt change in the 21st century for the respective components or phenomena within the Earth system, for the scenarios considered in this chapter.

Change in climate system component	Potentially abrupt (AR5 definition)	Irreversibility if forcing reversed	Projected likelihood of 21st century change in scenarios considered
Atlantic MOC collapse	Yes	Unknown	Very unlikely that the AMOC will undergo a rapid transition (<i>high confidence</i>)
Ice sheet collapse	No	Irreversible for millennia	Exceptionally unlikely that either Greenland or West Antarctic Ice sheets will suffer near-complete disintegration (<i>high confidence</i>)
Permafrost carbon release	No	Irreversible for millennia	Possible that permafrost will become a net source of atmospheric greenhouse gases (<i>low confidence</i>)
Clathrate methane release	Yes	Irreversible for millennia	Very unlikely that methane from clathrates will undergo catastrophic release (<i>high confidence</i>)
Tropical forests dieback	Yes	Reversible within centuries	Low confidence in projections of the collapse of large areas of tropical forest
Boreal forests dieback	Yes	Reversible within centuries	Low confidence in projections of the collapse of large areas of boreal forest
Disappearance of summer Arctic sea ice	Yes	Reversible within years to decades	Likely that the Arctic Ocean becomes nearly ice-free in September before mid-century under high forcing scenarios such as RCP8.5 (<i>medium confidence</i>)
Long-term droughts	Yes	Reversible within years to decades	Low confidence in projections of changes in the frequency and duration of megadroughts
Monsoonal circulation	Yes	Reversible within years to decades	Low confidence in projections of a collapse in monsoon circulations

24. To conclude the discussion of “tipping points,” Milieudefensie et al. refer to a publication on “cascade reactions” in which “the tipping of one tipping point can also initiate the tipping of other tipping points” (summons, margin numbers 441-444). They point out that the warning is being given that once that cascade has started, the climate can hardly be brought back (margin number 446).

25. It is immediately striking that the source cited by Milieudefensie et al. is not a publication of the IPCC. However, what can indeed be found in the IPCC reports and the work of working group I does not support the thinking behind such cascades. Working Group I did write the following in AR5 (emphasis added, attorneys):²⁰

²⁰ **Exhibit RO-264**, IPCC 2012, AR5: Climate Change 2013: The Physical Science Basis, Working Group I, Chapter 1: Introduction, p. 129.

Related to multiple climate states, and hysteresis, is the concept of irreversibility in the climate system. In some cases where multiple states and irreversibility combine, bifurcations or 'tipping points' can be reached (see Section 12.5). In these situations, it is difficult if not impossible for the climate system to revert to its previous state, and the change is termed irreversible over some timescale and forcing range. A small number of studies using simplified models find evidence for global-scale 'tipping points' (e.g., Lenton et al., 2008); however, there is no evidence for global-scale tipping points in any of the most comprehensive models evaluated to date in studies of climate evolution in the 21st century. There is evidence for threshold behaviour in certain aspects of the climate system, such as ocean circulation (see Section 12.5) and ice sheets (see Box 5.1), on multi-centennial-to-millennial timescales. There are also arguments for the existence of regional tipping points, most notably in the Arctic (e.g., Lenton et al., 2008; Duarte et al., 2012; Wadhams, 2012), although aspects of this are contested (Armour et al., 2011; Tietsche et al., 2011).

Working Group I also wrote the following in AR5 (emphasis added, attorneys):²¹

Abrupt Change

Several components or phenomena in the climate system could potentially exhibit abrupt or nonlinear changes, and some are known to have done so in the past. Examples include the AMOC, Arctic sea ice, the Greenland ice sheet, the Amazon forest and monsoonal circulations. For some events, there is information on potential consequences, but in general there is *low confidence* and little consensus on the likelihood of such events over the 21st century. {12.5.5, Table 12.4}

What the IPCC also describes is a linear connection between CO₂ emissions on the one hand and temperature increase on the other. This implies that the cascade scenario of a self-increasing effect is not being followed there, because then the connection would not be linear. Working Group I writes the following in AR5 (emphasis added, attorneys):²²

²¹ Exhibit MD-101, p. 1033.

²² Exhibit MD-99, p. 27.

Cumulative total emissions of CO₂ and global mean surface temperature response are approximately linearly related (see Figure SPM.10). Any given level of warming is associated with a range of cumulative CO₂ emissions²¹, and therefore, e.g., higher emissions in earlier decades imply lower emissions later. {12.5}

The *Synthesis Report* to AR5 also states the following (emphasis added, attorneys):²³

Multiple lines of evidence indicate a strong, consistent, almost linear relationship between cumulative CO₂ emissions and projected global temperature change to the year 2100 in both the RCPs and the wider set of mitigation scenarios analysed in WGIII (Figure SPM.5b). Any given level of warming is associated with a range of cumulative CO₂ emissions⁶, and therefore, e.g., higher emissions in earlier decades imply lower emissions later. {2.2.5, Table 2.2}

1.3.2 Mitigation and adaptation

26. For the rest, Milieudéfensie et al. outline a litany of possible consequences, in the sense of identifying categories and generalities, but do not pay any attention to the question of the extent and likelihood of those consequences. Milieudéfensie et al. regularly go no further than to sketch out the risks "*without additional mitigation and adaptation*".²⁴ That does not provide proper substantiation of their claims.

(a) Milieudéfensie et al. often outline risks in the event of significant temperature increases, or leave moot which scenarios they have in mind. But they usually fail to mention why they do that, and how likely it is. We have already stated in the opening arguments (part A) that states are busy fleshing out the energy transition (part 2.1). The system of the Paris Agreement also provides for national measures to become stricter over time, for instance in response to the first stocktake in 2023.²⁵ For that reason, it is not logical to assume scenarios without additional mitigation.

(b) Milieudéfensie et al. also often do not specifically address the question of the extent to which adaptation can take place.

²³ Exhibit MD-112, p. 8.

²⁴ For example, Summons, margin number 485.

²⁵ **Exhibit RK-1**, Paris Agreement, Article 4(3) and Article 14(2)-(3).

Milieudefensie et al. therefore do not even pretend to paint an accurate picture of the risks. As such, their assertions are insufficient to establish that the risks are such that what is being sought can be required of RDS.

27. This can be illustrated with an example. In margin number 485 of the summons, Milieudefensie et al. fill two pages with examples of consequences for (Western) European countries, and casually preface this only once with the words “*without additional mitigation and adaptation*”. And this long list of cases then contains things such as this:

dat het aantal doden bij overstromingen in 2080 circa 650 mensen per jaar zal bedragen waarvan 2/3 van de doden in de West-Europese EU-landen zal vallen.³⁶⁶

Ter toelichting: wereldwijd zal het aantal potentieel getroffen en volgens het IPCC zelfs in de honderden miljoenen lopen rond 2100:

“Due to sea-level rise throughout the 21st century and beyond, coastal systems and low-lying areas will increasingly experience adverse impacts such as submergence, coastal flooding, and coastal erosion (very high confidence)”³⁶⁷

[...]

By 2100, due to climate change and development patterns and without adaptation, hundreds of millions of people, will be affected by coastal flooding and displaced due to land loss (high confidence).”³⁶⁸ (onderstreping adv.)

If the source is consulted, it turns out that adaptation is not only possible, but also economically rational. Below is the source text (Exhibit MD-269, p. 364, emphasis added, attorneys):

For the 21st century, the benefits of protecting against increased coastal flooding and land loss due to submergence and erosion at the global scale are larger than the social and economic costs of inaction (limited evidence, high agreement). Without adaptation, hundreds of millions of people will be affected by coastal flooding and will be displaced due to land loss by year 2100; the majority of those affected are from East, Southeast, and South Asia (high confidence). {5.3.4.1, 5.4.3.1} At the same time, protecting against flooding and erosion is considered economically rational for most developed coastlines in many countries under all socioeconomic and sea level rise scenarios analyzed, including for the 21st century GMSLR of above 1 m (limited evidence, high agreement). {5.5.5}

Milieudefensie et al. do not explain why the risk described is nonetheless sufficient to demand of RDS what is being sought.

1.4 The Netherlands

1.4.1 Introduction

28. Since the District Court allowed Milieudefensie et al. to raise an alternative basis for their claims, namely the interests of residents of the Netherlands, it is appropriate to consider what Milieudefensie et al. assert about the risks they run.

29. Milieudefensie et al. did not assert much about the interests of the individual claimants. See, for example, margin number 496 of the Summons:

"The claimants in this lawsuit are already suffering consequences of climate change. After the announcement of this case and upon joining as co-claimants, numerous people told how they are already enduring the consequences of climate change. There were stories from elderly people who suffered so much from heat stress in the summer that they could not leave the house, which caused loneliness as well, in addition to the physical problems caused by heat stress. Co-claimants told about their increasing allergy problems because the flowering season of plants that cause hay fever is starting earlier and lasts considerably longer. In addition, many co-claimants expect major investments in, for example, their homes and gardens, because many Dutch homes and gardens are not equipped to drain off large volumes of rain during peak storms or to offer coolness during hot summers. Co-claimants also experienced damage due to (hail) storms or precisely due to periods of drought. Co-claimants who are gardeners or farmers expect many changes as a result of climate change. In the agriculture and horticulture sector, people expect to have to adapt their business model, because, among other reasons, they face increasingly unpredictable crops. As a result, they not only experience damage but also uncertainty about the future of their business."

30. With regard to the risks for the Netherlands as well, Milieudefensie et al. go no further than to mention categories and generalities.

Milieudefensie et al. are very brief about this in Chapter VII.2.2 of the summons. Milieudefensie et al. also often do not specifically address the question of where the consequences occur and to what extent those consequences can be mitigated. As such, their assertions are insufficient to establish that the risks are such that what is being sought can be required of RDS.

31. There are two elements that are particularly striking, however, and which RDS will therefore discuss. These are what Milieudefensie et al. call "heat stress" and the rise in the sea level.

1.4.2 Sources on "heat stress" and other passages not mentioned by Milieudefensie et al.

32. Milieudefensie et al. begin the discussion of direct consequences for the Netherlands with what they call "heat stress," health problems and mortality due to increased periods of hot weather (margin number 477 of the summons and worldwide, 450 and 452). A little further on, they cite 88,000 deaths in the EU per year around 2050 and 126,000 around 2080 (margin number 485 of the summons), with a cost of more than EUR 100 billion. This may also be what Milieudefensie et al. had in mind when they referred to the following passage in the Court of Appeal's judgment in *Urgenda*, namely "*Urgenda's assertion that an inadequate climate policy in the second half of this century will lead to hundreds of thousands of victims in Western Europe (alone).*"²⁶
33. Omissions by Milieudefensie et al. in this respect clearly illustrate why their assertions are insufficient to serve as substantiation for why what is being sought can be required of RDS.
34. To begin with, the source cited by Milieudefensie et al. themselves: they mention once at the beginning of a two-page list "without additional mitigation and adaptation". But if the source is consulted, it is prominent that the source assumes the absence of adaptation measures. Milieudefensie et al. do not discuss whether and why the absence of mitigation and adaptation can be assumed. Milieudefensie et al. also do not mention that, according to the source, a different

²⁶ Written arguments 2 Milieudefensie et al., margin number 107.

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calculation method would result in lower costs by a factor of 10. Milieudéfensie et al. do not explain whether the risk outlined is nonetheless sufficient to require of RDS what is being sought.

<p>Milieudéfensie et al. in the summons, margin number 485</p>	<p>Exhibit MD-167, pp. 8-9 (emphasis added, attorneys)</p>
<p>“that around 2050, approximately 88,000 people will die every year in the EU as a result of hot weather; that around 2080, there will be some 126,000 deaths per year in the EU as a result of hot weather; that the welfare costs of that will be approximately EUR 102 billion around 2050 and some EUR 146 billion around 2080”</p>	<p>The study has first focused on heat related mortality. Under a medium to high emission (A1B) scenario,</p> <p>with no mitigation or adaptation, the study estimates that there could be an additional 26 thousand deaths/year from heat by the 2020s (2011-2040), rising to 88 thousand/year by the 2050s (2041-2070) and 126 thousand/year by the 2080s (2071-2100). These values reflect the changes from climate change alone. While heat-related mortality in Europe is projected to increase in all regions, there are relatively higher levels of climate change attributable heat deaths in Southern Europe. The cost of these impacts depends very significantly on the valuation method used for changes in the risk of fatality, specifically whether a Value of a Life Year Lost (VOLY) or a Value of a Statistical Life (VSL) is used. Using the latter, the estimated welfare costs are €30 billion/year by the 2020s (2011-2040), €102 billion/year by the 2050s (2041-2070) and € 146 billion/year by the 2080s (2071-2100). but these values fall by over an order of magnitude if the VOLY approach is used.</p>

35. In margin number 477, Milieudefensie et al. discuss consequences for the Netherlands by pointing to heat waves in the past. However, they do not explain how seriously that risk should be weighed for the Netherlands. They also do not mention that the IPCC does not mention health problems caused by periods of hot weather in the list of risks for Europe.²⁷ An earlier study cited by Milieudefensie et al. mentions an impact within Europe on this point only for the "Mediterranean region" and does not comment on the seriousness of it.²⁸

36. Back to the adaptation possibilities. Milieudefensie et al. say nothing about these, but merely refer to a heat plan that shows problems in the past. They do so as follows (summons, margin number 477):

Nederland ondervindt nu en in de komende decennia naast de vele indirecte gevolgen uiteraard ook directe gevolgen van een steeds sterker wordende opwarming. De toegenomen hitteperiodes in Nederland bijvoorbeeld, tonen dat ook. Uit de wetenschappelijke literatuur volgt dat er een relatie is tussen klimaatverandering, hitteperiodes en gezondheidsklachten en sterfgevallen in de samenleving.³⁵¹ Op basis van de wetenschappelijke bevindingen heeft het Ministerie van Volksgezondheid, Welzijn en Sport in 2007 een Hitteplan opgesteld. Het Hitteplan bevestigt dat in Nederland in 2003 en 2006 als gevolg van aanhoudende hitteperiodes enkele honderden mensen aan hittestress zijn overleden.³⁵² In Europa als geheel overleden tijdens de extreem hete zomer van 2003 naar schatting 35.000 mensen als direct gevolg van de toen aanhoudende uitzonderlijke hoge temperaturen – het merendeel in Frankrijk.³⁵³ Daarnaast is er ook een grote groep mensen wier gezondheid en kwaliteit van leven door hittestress wordt aangetast. Het gaat volgens het Hitteplan om gevolgen variërend van verminderd welbevinden, huidaandoeningen, uitdroging, ademhalings- en circulatieproblemen tot hitteberoertes.³⁵⁴





37. However, they entirely omit any mention of the legion of references to effective adaptation possibilities in the other sources. That is strange, because those possibilities are described very extensively. For example, the IPCC does not mention the risk of periods of hot weather for Europe. But where it will be a factor according to the IPCC, in North America in particular, the IPCC mentions adaptation possibilities, such as air conditioning, which "*can effectively reduce risk*". The IPCC writes (emphasis added, attorneys):²⁹

²⁷ Exhibit MD-113, p. 22.

²⁸ Exhibit MD-161, p. 29. Table TS.2 there says nothing for "North-Western Europe" in row 4.4.4.

²⁹ Exhibit MD-113, p. 23.

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Heat-related human mortality <i>(high confidence)</i> [26.6, 26.8]	<ul style="list-style-type: none"> • Residential air conditioning (A/C) can effectively reduce risk. However, availability and usage of A/C is highly variable and is subject to complete loss during power failures. Vulnerable populations include athletes and outdoor workers for whom A/C is not available. • Community- and household-scale adaptations have the potential to reduce exposure to heat extremes via family support, early heat warning systems, cooling centers, greening, and high-albedo surfaces. 		Very low	Medium	Very high	
			Present			
			Near term (2030–2040)			
			Long term (2080–2100) 2°C 4°C			

38. And what Milieudefensie et al. also fail to mention is that the use of such adaptive measures, to the extent even necessary, was precisely what was regulated more than a decade ago by the Dutch heat plan.³⁰

Met het treffen van de in dit plan beschreven maatregelen kan de volksgezondheid in algemene zin, en de gezondheidstoestand en de levenskwaliteit van de risicogroepen in het bijzonder, tijdens aanhoudende hitte beschermd en verbeterd worden. Er wordt hierbij onderscheid gemaakt tussen mensen die in zorginstellingen leven en sterk afhankelijk zijn van de organisatie waarvan ze zorg ontvangen en mensen die (semi-)zelfstandig wonen.










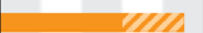





39. More generally, Milieudefensie et al. also hold out “key risks” that, according to them, are comparable to criteria under Dutch tort law.³¹ However, while saying it wants to fit the point into *Dutch* tort law, Milieudefensie et al. fail to mention there that in AR5, the IPCC assesses “key risks” for various areas and for Europe, presents a list that is short and emphasises possibilities for adaptation for each point. This is evidenced by the following overview from the *summary for policymakers* to AR5:³²

³⁰ Exhibit MD-162, p. 8.

³¹ Summons, margin numbers 421-422.

³² The table shown is in Exhibit MD-113, p. 22 (*Summary for Policymakers, working group II in AR5*).

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Europe				
Key risk	Adaptation issues & prospects	Climatic drivers	Timeframe	Risk & potential for adaptation
Increased economic losses and people affected by flooding in river basins and coasts, driven by increasing urbanization, increasing sea levels, coastal erosion, and peak river discharges (<i>high confidence</i>) [23.2-3, 23.7]	(Adaptation can prevent most of the projected damages (<i>high confidence</i>)). • Significant experience in hard flood-protection technologies and increasing experience with restoring wetlands • High costs for increasing flood protection • Potential barriers to implementation: demand for land in Europe and environmental and landscape concerns			Very low Medium Very high
			Present	
			Near term (2030–2040)	
			Long term 2°C (2080–2100)	
			4°C	
Increased water restrictions. Significant reduction in water availability from river abstraction and from groundwater resources, combined with increased water demand (e.g., for irrigation, energy and industry, domestic use) and with reduced water drainage and runoff as a result of increased evaporative demand, particularly in southern Europe (<i>high confidence</i>) [23.4, 23.7]	• Proven adaptation potential from adoption of more water-efficient technologies and of water-saving strategies (e.g., for irrigation, crop species, land cover, industries, domestic use) • Implementation of best practices and governance instruments in river basin management plans and integrated water management			Very low Medium Very high
			Present	
			Near term (2030–2040)	
			Long term 2°C (2080–2100)	
			4°C	
Increased economic losses and people affected by extreme heat events: impacts on health and well-being, labor productivity, crop production, air quality, and increasing risk of wildfires in southern Europe and in Russian boreal region (<i>medium confidence</i>) [23.3-7, Table 23-1]	• Implementation of warning systems • Adaptation of dwellings and workplaces and of transport and energy infrastructure • Reductions in emissions to improve air quality • Improved wildfire management • Development of insurance products against weather-related yield variations			Very low Medium Very high
			Present	
			Near term (2030–2040)	
			Long term 2°C (2080–2100)	
			4°C	

40. That list also includes a rise in sea level, which brings RDS to the next point.

1.4.3 Rise in sea level

41. In margin number 92 of written arguments 2, Milieudefensie et al. referred without reservation to the following paragraph 5.6.2 of the judgment of the Supreme Court in *Urgenda*.

“The only possible conclusion is that the State would be required pursuant to Articles 2 and 8 ECHR to take measures against the real threat of dangerous climate change, if this were merely a national problem. After all, in view of the findings above at 4.2-4.7, this involves a ‘real and immediate risk’ as referred to in 5.2.2 above and there is a risk of serious damage to the life and welfare of residents of the Netherlands. This applies for, among other things, the possibility of a strong increase in sea level, which could make the Netherlands partly uninhabitable. The fact that this risk will only be able to materialise in a few decades and does not concern specific persons or a specific group but large parts of the population does not mean, contrary to what the State argues, that Articles 2 and 8 ECHR do not offer protection against this threat [...]


Already the existence of a sufficiently real possibility of manifestation of this risk therefore entails that appropriate measures must be taken" (emphasis added, attorneys).

42. In the summons, Milieudefensie et al. themselves also placed a great deal of emphasis on this. Briefly put, they:

- referred to the KNMI's press release and, on the basis of that, asserted an impending increase in sea level by 2.5-3 metres in 2100 and 5-8 metres in 2200 (margin numbers 487-490 of the summons); and
- referred to an article in the popular magazine Vrij Nederland which states that adaptation would be difficult at that point and that "more and more (inhabited) land [will] have to be surrendered" (margin number 490 of the summons).

43. More specifically, Milieudefensie et al. write in margin number 487 of the summons: "*the KNMI reported in 2017 on the basis of its own calculation that new scientific insights show that sea levels could already rise by 2.5 to 3 metres this century in the event of a high global emission scenario.*"

44. It is useful in that case to start with another source of more recent date, namely the most recent *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* from 2019. A sea-level increase of approximately 1 meter in 2100 can be found there in the *summary for policymakers* on the RCP8.5 scenario (emphasis added, attorneys):³³

- B.3.1  The global mean sea level (GMSL) rise under RCP2.6 is projected to be 0.39 m (0.26–0.53 m, *likely* range) for the period 2081–2100, and 0.43 m (0.29–0.59 m, *likely* range) in 2100 with respect to 1986–2005. For RCP8.5, the corresponding GMSL rise is 0.71 m (0.51–0.92 m, *likely* range) for 2081–2100 and 0.84 m (0.61–1.10 m, *likely* range) in 2100. Mean sea level rise projections are higher by 0.1 m compared to AR5 under RCP8.5 in 2100, and the *likely* range extends beyond 1 m in 2100 due to a larger projected ice loss from the Antarctic Ice Sheet (*medium confidence*). The uncertainty at the end of the century is mainly determined by the ice sheets, especially in Antarctica. {4.2.3, Figures SPM.1, SPM.5}

³³ Exhibit MD-290, p. 20.

And, for the sake of clarity, that RCP8.5 scenario is based on "very high GHG emissions". See the Synthesis Report to AR5 (emphasis added, attorneys):³⁴

Anthropogenic GHG emissions are mainly driven by population size, economic activity, lifestyle, energy use, land use patterns, technology and climate policy. The Representative Concentration Pathways (RCPs), which are used for making projections based on these factors, describe four different 21st century pathways of GHG emissions and atmospheric concentrations, air pollutant emissions and land use. The RCPs include a stringent mitigation scenario (RCP2.6), two intermediate scenarios (RCP4.5 and RCP6.0) and one scenario with very high GHG emissions (RCP8.5). Scenarios without additional efforts to constrain emissions ('baseline scenarios') lead to pathways ranging between RCP6.0 and RCP8.5 (Figure SPM.5a). RCP2.6 is representative of a scenario that aims to keep global warming *likely* below 2°C above pre-industrial temperatures. The RCPs are consistent with the wide range of scenarios in the literature as assessed by WGIII⁵. {2.1, Box 2.2, 4.3}

45. The KNMI's press release shows how the figures that the KNMI mentioned in 2014 should be seen. It says there that this is an extreme rise in sea levels, if everything goes wrong, with the highest CO₂ emission scenario, and an earth that is warming up significantly (emphasis added, attorneys):³⁵

Hoe hoog kan de zeespiegel maximaal stijgen in de 21e eeuw als de opwarming van de aarde en de CO₂-uitstoot niet worden verminderd? Deze vraag hebben KNMI-onderzoekers bestudeerd in een zojuist verschenen studie. In plaats van te kijken naar wat het meest waarschijnlijke is dat zal gebeuren, zoals in de KNMI'14-klimaatscenario's, is hier juist gekeken naar extreme zeespiegelstijging. Wat zou de stijging kunnen zijn als alles tegen zit? De onderzoekers hebben berekend dat een stijging van 2,5 tot 3 meter in deze eeuw niet uitgesloten is. Met de grootste bijdrage van Antarctica.

[...]

³⁴ Exhibit MD-112, p. 8.

³⁵ Exhibit MD-168.

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projection including rapid Antarctic ice sheet mass loss. In beide onderzoeken is uitgegaan van het hoogste CO₂-emissiescenario en een sterk opwarmende aarde. In het akkoord van Parijs (2015) is afgesproken de uitstoot van broeikasgassen terug te brengen om de opwarming van de aarde te temperen.

46. Milieudefensie et al. then goes on to note that a report by Deltares does not clarify what the consequences for the inhabitability of the Netherlands would be in the event of a very high rise in sea levels after 2100 (summons, margin number 490). Here, too, even apart from the long term mentioned in combination with very high emission scenarios, Milieudefensie et al. do not do justice to the possibilities that Deltares does indeed outline. For example, Deltares states the following.³⁶

³⁶ Exhibit MD-68, pp. 75-76.

7.1.2 Gevolgen voor het Deltaprogramma

Algemene conclusies voor het Deltaprogramma op basis van de verkenning zijn:

1. De plausibiliteit en mogelijke gevolgen van een extra versnelde zeespiegelstijging zijn belangrijk om nader te onderzoeken, omdat deze stijging er na 2050 toe kan leiden dat we anders met ons water- en kustbeheer om zullen moeten gaan. De mate van versnelling van de zeespiegelstijging is onzeker, maar kan belangrijke gevolgen hebben voor Nederland en voor de voorkeursstrategieën van het Deltaprogramma.
2. Extra versnelde zeespiegelstijging is belangrijk, maar nog niet urgent voor het Deltaprogramma, omdat we nu nog niet direct op een andere strategie over hoeven te gaan. Er is tijd om het signaal en de mogelijke gevolgen nader te onderzoeken en na te denken over alternatieven en deze tijdig in te zetten indien dit nodig blijkt. Het verkrijgen van signalen en het bijstellen van strategieën is een essentieel onderdeel van adaptief deltamanagement. Het goed monitoren door analyses van (internationale) observaties en het bijhouden en opstellen van toekomstprojecties is dan ook belangrijk om signalen tijdig te krijgen en onzekerheden te verkleinen.
3. Het is raadzaam om bij de (extra) versnelde zeespiegelstijging ook met de periode na 2100 rekening te houden. De zeespiegel blijft ook na 2100 (mogelijk sneller) stijgen. Dergelijke stijgingen zijn nu al relevant voor investeringen die in de komende jaren worden gedaan met een lange beoogde levensduur en/of effect op de samenleving. Sommige processen, zoals aanpassing van

grondwaterpeilen aan zeespiegelstijging en verzilting via het grondwater gaan (zeer) langzaam, maar duren onverminderd voort. Een en ander betekent dat aanpassing aan veranderende natuurlijke randvoorwaarden nog zeer lang het adagium in het Deltabeheer zal zijn.

4. Tijd wordt cruciaal bij een extra versnelde zeespiegelstijging. Volgens de projecties van het KNMI wordt de versnelde zeespiegelstijging vanaf het jaar 2050 voor het eerst merkbaar. Na 2050 verloopt de stijging veel sneller dan nu en moet er binnen korte tijd veel gebeuren, zoals sneller en meer suppleren aan de kust, het op kortere termijn versterken of vervangen van stormvloedkeringen en andere hoogwaterbeschermingskunstwerken dan we nu voorzien, en het verplaatsen en vergroten van zoetwaterinlaten. Ter illustratie: aanpassingen die in 1995 ontworpen zijn voor een stijging van 0,5 m hadden een functionele levensduur van 65 jaar. Bij versnelde zeespiegelstijging kan de functionele levensduur per 0,5 m zeespiegelstijging in 2060 zijn afgenomen tot 20 jaar en in 2080 tot 10 jaar⁵⁹. Dat betekent dat adaptatie aan relatief kleine zeespiegelstijgingen niet meer volstaat. De maatregelen zullen dan immers steeds korter effectief zijn en snellere planning en besluitvorming zal nodig zijn. Of en tot welk moment de voorkeursstrategieën toereikend zijn, zal in de eerste plaats hiervan afhangen. Naast de mate van zeespiegelstijging is dus ook de stijgsnelheid belangrijk; zowel voor de gevolgen (voorbeeld: bij grotere snelheden moet meer zand gesuppleerd worden), als voor het bepalen welke adaptatiemaatregelen nodig zijn.

47. It is also stated that coastal works must be adjusted for *"the level of protection to at least remain equivalent"* (emphasis added, attorneys):³⁷

³⁷ Exhibit MD-68, p. 77.

Bij een zeespiegelstijging van meer dan 1 m (vanaf 2070 à 2100). Deze stijging ligt buiten de huidige bandbreedte van de Deltascenario's tot 2100. In de projecties met extra versnelde zeespiegelstijging wordt 1 m stijging op zijn vroegst omstreeks 2070-2085 bereikt. In alle scenario's stijgt de zeespiegel na 2100 meer dan 1 m. Bij extra versnelde zeespiegelstijging kan dit oplopen tot 5 tot 8 m in 2200.

- *Kustfundament, Waddenzee en zuidwestelijke delta:*
 - Als gevolg van de hogere stijgingssnelheid zal tot 25 keer meer zand nodig zijn om mee te groeien met de zeespiegelstijging.
- *Waterveiligheid:*
 - Tussen 1 en 2 m stijging nemen de sluitfrequenties van de open afsluitbare keringen verder toe. Bij 2 m is er, onder de huidige sluitcriteria, een dusdanig grote toename van de sluitfrequentie van de Maeslantkering en Oosterscheldekering dat deze nagenoeg permanent gesloten zijn.
 - Tussen 1 en 2 m stijging neemt de frequentie van overschrijding van de ontwerppeilen van de keringen toe met een factor 300 tot 10.000; tot (meer dan) eens in de 10 jaar (Maeslantkering, Oosterscheldekering en Haringvlietdam).
 - Vanaf 1,35 m zeespiegelstijging is het ook bij een verhoging van het streefpeil met 0,6 m onder gemiddelde condities niet meer mogelijk om onder vrij verval te spuien door de Afsluitdijk.
 - Bij een zeespiegelstijging van 1,75 m is er een pompcapaciteit op de Afsluitdijk nodig tot maximaal 3200 m³/s om alle IJsselafvoer en neerslagoverschot af te voeren.
 - Als we er van uitgaan dat we minimaal een gelijkblijvend beschermingsniveau willen handhaven, lijkt het een redelijke veronderstelling dat de grote kunstwerken moeten zijn aangepast of vervangen bij een zeespiegelstijging van 1 à 1,5 m. Op zijn vroegst, onder de aanname van een extra versnelde zeespiegelstijging, wordt dat niveau omstreeks 2070 bereikt.

48. That is in line with what the IPCC reports in AR5 (emphasis added, attorneys):³⁸

Through the Delta Programme, the Dutch government has set out far-reaching recommendations on how to keep the country flood-proof over the 21st century taking into account a sea level rise as high as 0.65 to 1.3 m by 2100. These recommendations constitute a paradigm shift from "fighting" the forces of nature with engineered structures to "working with nature" and providing "room for river" instead (Kabat et al., 2009). The recommendations include soft and environmentally friendly solutions such as preserving land from development to accommodate increased river inundation, maintaining coastal protection by beach nourishment, improving the standards of flood protection, and putting in place the necessary political-administrative, legal, and financial resources (Stive et al., 2011).

49. Although the Supreme Court, and Milieudefensie et al. by reference thereto, state that parts of the Netherlands can become uninhabitable "in a few decades," there is no sufficiently solid basis for this. It was up to Milieudefensie et al. to substantiate that. They failed to do so.
50. In other respects, too, Milieudefensie et al. do not assert enough facts with regard to the effects of rising sea levels. The likelihood of the more extreme scenarios is not explained by Milieudefensie et al., for example, but Milieudefensie et al. do, however, base themselves on

³⁸ Exhibit MD-269, p. 391.

those in claiming that the Wadden Sea will be “largely permanently underwater” in 2100 if the increase were to be 1.7 metres at that point.³⁹ Well, that is what it says, but in 2019 the IPCC came to a level significantly lower than that 1.7 metres, even in the scenario with “*very high GHG emissions*,” as already mentioned. The source cited by Milieudefensie et al. therefore talks about the Wadden Sea being permanently underwater in 300 or 1,000 years in the two least positive IPCC scenarios that it discusses and “*the conclusion is therefore that none of the tidal basins of the Dutch Wadden Sea will be permanently underwater by 2100, even if the most pessimistic scenario of [sea level increase] turns out to be the case*”, according to that source.⁴⁰ But Milieudefensie et al. leave those parts out. Milieudefensie et al. also make no mention whatsoever about the extent to which intervention is possible to support the Wadden Sea, which is also why it has asserted insufficient facts. Incidentally, that omission is all the more striking because one of the publications underlying what Milieudefensie et al. do submit, and which they omitted, ends with the comment that “[a]nticipating accelerated SLR [sea-level rise, attorneys], *the development of nourishment strategies that will increase sediment import to the Wadden Sea is recommended*”.⁴¹ Milieudefensie et al. do not even assert that what is being sought can be required of RDS because of the effects on the Wadden Sea, let alone that they assert sufficient facts for that.

51. The conclusion of all this is the following. Milieudefensie et al. present various risks. In doing so, they frequently misrepresent the scientific sources, as I have shown on the basis of a number of examples. This is pressing, because the IPCC reports very carefully in order to provide policymakers with information relating to important policy decisions. Milieudefensie et al. moreover omit relevant other passages and close their eyes to measures that States are taking and are able to take. And all this while presenting “*the best available science*” as the foundation for their claims. All in all, Milieudefensie et al. have not properly

³⁹ Summons, margin number 228.

⁴⁰ Exhibit MD-67, p. 10.

⁴¹ Zheng Bing Wang e.a., 'Sediment budget and morphological development of the Dutch Wadden Sea: impact of accelerated sea-level rise and subsidence until 2100', Netherlands Journal of Geosciences 2018, p. 208, mentioned at the end of Exhibit MD-67.

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substantiated what risks make it such that what is being sought can be required of RDS. This does not alter the fact that the importance of tackling climate change is beyond doubt and that RDS is playing and is willing to play its role in the societal energy transition.

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Attorneys