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"The Serious Challenges of Causation for Anthropogenic Climate Change"

Hon James Allsop AC* & Ryan Harvey+

A. Introduction

1. The scientific consensus is that global surface temperatures will likely exceed 1.5°C above 1850-1900 levels during the 21st century. The potentially devastating consequences of anthropogenic climate change has seen a surge in climate-related litigation in recent years. Australia now ranks as the second most active forum for these disputes, meaning that Australian courts are facing more related legal issues than ever before. In attributing legal responsibility to State and non-State actors, many of these cases challenge fundamental assumptions and established legal principles.

2. This paper does not take sides or recommend courses of action; rather, it poses questions for Australian courts to consider when resolving tricky questions of causation in climate-related litigation. Central to this is the nascent field of "attribution science", which has its own issues. This paper argues that courts must feel free and be able to scrutinise the climate science (especially the science of attribution) so that the relevant adjudicative facts can be confidently established. This paper also makes the suggestion that Courts should not be shy about utilising

* Arbitrator and former Chief Justice of the Federal Court of Australia.

+ Barrister at 7 Wentworth Selborne.

the machinery of court rules – for example, by appointing contradictors or independent experts, or granting leave to *amici curiae* and interveners to appear – to ensure these scientific claims are forensically challenged. In short, there must be a firm, evidence-based foundation for any attribution of legal responsibility for anthropogenic climate change.

B. Assumptions

3. The formulation and implementation of climate change policy has generated fierce (sometimes vituperative) political debate; courts risk being caught in a crossfire of competing political or social views. It is inevitable, therefore, that climate-related litigation provokes a broader discussion about two critical issues: *first*, the rightful role of the judiciary when resolving politically sensitive legal claims; and *second*, the appropriateness of reconsidering (or refashioning) fundamental legal principles to adapt to a changing society and changing environment.

4. An answer to the first critical issue can be found in the many judgments of the High Court. "The legitimacy of the Judicial Branch ultimately depends upon its reputation for impartiality and non-partisanship", as stated in the opinion of the U.S. Supreme Court in *Mistretta v United States*,[1] and adopted by McHugh J[2] and Gummow J[3] in *Grollo*. This "reputation" is protected by our "inherited [common law] tradition of judicial independence",[4] which, the majority of the Court in *Ebner v Official Trustee in Bankruptcy*[5] explained, has its "deepest historical roots" in (citations omitted):

> Magna Carta (with its declaration that right and justice shall not be sold) and the *Act of Settlement 1700* (UK) (with its provisions for the better securing in England of judicial independence). It is a principle which could be seen to be behind the

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1 *Mistretta v United States* 488 U.S. 361, 407 (1989).

2 ***Grollo** v Commissioner of Australian Federal Police* (1995) 184 CLR 348, 377 (McHugh J).

3 *Grollo* (1995) 184 CLR 348, 392 (Gummow J).

4 *Wilson v Minister for Aboriginal & Torres Strait Islander Affairs* (1996) 189 CLR 1, 12 (Brennan CJ, Dawson, Toohey, McHugh and Gummow JJ).

5 *Ebner v Official Trustee in Bankruptcy* (2000) 205 CLR 337, [3] (Gleeson CJ, McHugh, Gummow and Hayne JJ).

> confrontation in 1607 between Coke CJ and King James about the supremacy of law. It could be seen to be applied when Bacon was stripped of office and punished for taking bribes from litigants.

5. Similarly, in *Forge v Australian Securities and Investments Commission*,[6] Gleeson CJ adopted these comments of Stevens J in *Republican Party of Minnesota v White*: "in litigation, issues of law or fact should not be determined by popular vote; it is the business of judges to be indifferent to unpopularity."[7] Judicial independence thus means more than freedom from executive or legislative coercion; it demands that judges resist tribalism, populism, and the pressure of their peers and administrative superiors.

6. Judicial independence gives courts the space to resolve disputes – both between citizens and between citizens and the State (using those terms in a broad and constitutionally neutral sense)[8] – according to law (a decision-making process based in evidence and respect for principle). Courts have this freedom because judicial power is presumed to be protective in nature; that is to say, courts serve to protect the individual, the group, and society by declaring and enforcing rights and obligations, by repairing wrongs by orders for compensation or orders to enforce lawful conduct, and by restraining unlawful conduct.[9] Accepting this, judicial power should not be wielded in gallant pursuit of some cause, or as some egoic extension of the self. There is, therefore, no reason to agonise over the role of the courts in climate-related cases, or indeed any other.

7. As to the second critical issue, the idea that litigation might justify legal change is hardly startling. As Benjamin Cardozo, the great American jurist, said extra-curially: there is an enduring conflict between stability and progress, mediated by

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6 *Forge v Australian Securities and Investments Commission* (2006) 228 CLR 45, [124] (Gleeson CJ).

7 *Republican Party of Minnesota v White* 536 U.S. 765, 798 (2002).

8 James Allsop, *Climate Change and Legal Responsibility*, paper presented at the 4th Judicial Roundtable, Durham Law School, 26 April 2024, 2-3.

9 James Allsop, *Climate Change and Legal Responsibility*, paper presented at the 4th Judicial Roundtable, Durham Law School, 26 April 2024, 2-3.

a philosophy of change, informed or supplied by a principle of growth.[10] After quoting Binding that: "Law is an order or system of human freedom", he also said "[t]he opposites, liberty and restraint, the individual and the group are phases of those wider opposites, the one and the many, rest and motion, at the heart of all being. Dichotomy is everywhere."[11] Change, as much as stasis, is baked into the system. It is not that change cannot occur, but that change must be principled.

8. Let us also say something about the scientific consensus, which is no more and no less than that: a general level of agreement among most scientists. It is entirely possible that one day, aspects of this consensus will be shown to be mistaken, but that is hardly a reason to disregard it. Science, after all, (like law) advances by error as well as insight. If insight is the only standard, then no science could live up to it. It is also beside the point. It is not that the scientific consensus must be accepted unthinkingly, but that courts should give it due consideration. This means testing the assumptions and methodologies of anthropogenic climate change, as is usual for any opinion evidence in a court of law (a point examined in detail below).

9. The scientific consensus is summarised in the **Synthesis Report** of the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (**IPCC**),[12] which was published following the IPCC's 58th Session (held in Interlaken, Switzerland from 13 - 19 March 2023). According to the Synthesis

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10 "The Growth of the Law" in Margaret Hall (ed.), *Selected Writings of Benjamin Nathan Cardozo: the Choice of Tycho Brahe* (Fallon Publications, 1947), 186.

11 "The Paradoxes of Legal Science" in Margaret Hall (ed.), *Selected Writings of Benjamin Nathan Cardozo: the Choice of Tycho Brahe* (Fallon Publications, 1947), 333.

12 The history and function of the IPCC was neatly summarised by the Dutch Supreme Court in *The State of the Netherlands v Urgenda Foundation*, The Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation) https://www. urgenda.nl/wp-content/uploads/ENG-Dutch-Supreme-Court-Urgenda-v-Netherland s-20-12-2019.pdf:

> [The IPCC] was created in 1988 under the auspices of the United Nations by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP). The IPCC's objective is to obtain insight into all aspects of climate change through scientific research. The IPCC does not conduct research itself, but studies and assesses, inter alia, the most recent scientific and technological information that becomes available around the world. The IPCC is not just a scientific organisation, but an intergovernmental organisation as well.

Report, human activities, principally through emissions of greenhouse gases (**GHGs**), have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850-1900 in 2011-2020.[13] Global surface temperature has risen faster since 1970 than in any other 50-year period over at least the last 2000 years,[14] and average annual GHG emissions during 2010-2019 were higher than in any previous decade on record.[15]

10. The Synthesis Report states that this increase in global surface temperature has caused widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere which has led to weather and climate extremes such as heatwaves, heavy rainfall, droughts and cyclones, in all regions in the world.[16] Substantial damage, with increasingly irreversible losses in ecosystems and species, is expected to occur if this rapid global warming is left unchecked. For example, the Synthesis Report states that, over the next 2000 years, global mean sea level will rise by about 2-3 metres even if warming is limited to 1.5°C (or 2-6 metres if limited to 2°C).[17]

11. Importantly, global surface temperature is expected to increase. According to the Synthesis Report, global GHG emissions in 2030 implied by nationally determined contributions announced by October 2021 make it likely that warming will exceed 1.5°C during the 21st century and make it harder to limit warming below 2°C.[18] In fact, depending on the volume of GHG emissions in the 21st century, the best estimates are that a 1.5◦C temperature increase will occur in the near term, while warming for 2081-2100 spans a range of 1.4◦C for very low GHG emissions, to 2.7◦C for intermediate GHG emissions, and 4.4◦C for very high GHG emissions.[19]

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13 Synthesis Report, [A.1.1].

14 Synthesis Report, [A.1.1].

15 Synthesis Report, [A.1.4].

16 Synthesis Report, [A.2.1].

17 Synthesis Report, [B.3.1].

18 Synthesis Report, [A.4].

19 Synthesis Report, [B.1.1].

And even if warming could be limited to temperature rises of 1.5°C and 2°C, this would require "rapid, deep and in most cases immediate GHG emission reductions".[20] If the 1.5°C marker is overshot, the impacts are predicted to be irreversible, especially on vulnerable ecosystems, such as polar, mountain, and coastal regions, given their exposure to ice-sheet melt, glacier melt, and sea level rises.[21] The larger the overshoot, the more net negative carbon dioxide (**CO2**) emissions would be needed to return to 1.5°C by 2100.[22]

C. Global trends of climate change litigation

12. While legislatures worldwide have struggled to legislate coherent responses to anthropogenic climate change, litigation is increasingly being used to attribute legal responsibility for harms.

13. We highlight three trends in particular. *First*, the number of climate-related disputes has, on the whole, been increasing. A 2023 Report[23] published by the Grantham Research Institute on Climate Change and the Environment found that Columbia Law School's Sabin Center had recorded 2,341 cases, 190 of which were filed in the previous 12 months.[24] Around two-thirds of these cases (1,557) have been filed since 2015:[25] the year of the "Paris Agreement".[26] It is a sobering fact that Australia has the second-highest number of documented climate-related cases after the U.S.[27]

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20 Synthesis Report, [B.6].

21 Synthesis Report, [B.7.2].

22 Synthesis Report, [B.7.3].

23 Joana Setzer and Catherine Higham, "Global trends in climate change litigation: 2023 snapshot" (June 2023) Grantham Research Institute on Climate Change and the Environment.

24 Setzer & Higham (2023), 2.

25 Setzer & Higham (2023), 2.

26 *Paris Agreement to the United Nations Framework Convention on Climate Change* (Adopted 12 December 2015; entered into force Nov. 4, 2016) T.I.A.S. No. 16-1104.

27 Setzer & Higham (2023), 12.

14. *Secondly*, climate-related litigation defies categorisation. NGOs and individuals have brought claims targeting a variety of State and non-State actors; these actions raise human rights issues, enforce or reject legislative standards, seek to attribute past and future responsibility for loss and damage, and even challenge investment decisions and corporate policy commitments.[28]

15. *Thirdly*, there is evidence that this litigation has been broadly effective at the international level. The Grantham Report just mentioned records that, when it assessed judicial outcomes, over 50% of the 549 climate change cases with interim or final rulings rendered outcomes that were "favourable to climate action" (e.g. new policies and measures). But the authors of the Report recognised that "even when there is a positive judicial outcome, it is not always clear that the way in which a judgment is implemented would lead to an increase in climate mitigation or adaptation."[29]

16. We address these trends with the appreciation that, absent governmental intervention, more climate-related litigation in Australia is probable, and courts must therefore have the conceptual tools to respond appropriately.

D. Comparative judicial approaches

17. This Section compares how Australian and international courts have approached causation questions in seven climate-related cases. We examine each case chronologically.

Kivalina

18. The first case is *Native Village of **Kivalina** & Ors v Exxonmobile Corp. & Ors*.[30] The plaintiffs were the Native Village of Kivalina and the City of Kivalina, the governing bodies of an Inupiat Eskimo village of around 400 people, located

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28 Setzer & Higham (2023), 5-6.

29 Setzer & Higham (2023), 4.

30 *Kivalina*, No. 09-17490 (9th Cir. 2012).

on the northwest coast of Alaska. On 26 February 2008, the plaintiffs brought "a suit to recover damages from global warming caused by defendants' actions", namely 24 oil, energy, and utility companies, in the U.S. **District Court** (Northern District of California). The plaintiffs sought damages under a federal common law claim of nuisance, based on the defendants' alleged contributions to the excessive emission of carbon dioxide and other greenhouse gases, which cause "global warming".[31] The defendants responded with motions to dismiss the complaint for lack of jurisdiction, contending that the claims were not justiciable and the plaintiffs lacked the relevant standing, because the injury was not "fairly traceable" to the defendants' conduct. The District Court accepted those arguments, granted the motions, and dismissed the complaint.[32]

19. Causation was considered as part of the "fair traceability" test, which requires proof of a substantial likelihood that the defendant's conduct caused plaintiff's injury in fact.[33] The plaintiffs rightly conceded that they could not trace their alleged injuries to any one defendant, but that was unnecessary they said. The plaintiffs submitted that they needed only to prove that the defendants "contributed" to their injuries, relying on statutory water pollution claims by way of analogy. The District Court was not convinced, finding that those statutory claims (applicable "where the plaintiff shows that a defendant's discharge exceeds Congressionally-prescribed federal limits") were properly distinguishable, and even if the contribution theory were otherwise applicable it was inapposite.[34] This was because the plaintiffs did not, and could not, allege that the "seed" of their injury could be traced to any of the defendants personally.[35] The District Court reasoned (emphasis added):[36]

> [T]here is no realistic possibility of tracing any particular alleged effect of global

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31 We note that the label of "global warming" is commonly less preferred to the label of "climate change".

32 *Native Village of Kivalina v ExxonMobil Corp.*, 663 F. Supp. 2d 863 (N.D. Cal. 2009), 868.

33 *Native Village of Kivalina v ExxonMobil Corp.*, 663 F. Supp. 2d 863 (N.D. Cal. 2009), 878.

34 *Native Village of Kivalina v ExxonMobil Corp.*, 663 F. Supp. 2d 863 (N.D. Cal. 2009), 879-880.

35 *Native Village of Kivalina v ExxonMobil Corp.*, 663 F. Supp. 2d 863 (N.D. Cal. 2009), 880.

36 *Native Village of Kivalina v ExxonMobil Corp.*, 663 F. Supp. 2d 863 (N.D. Cal. 2009), 880.

> warming to any particular emissions by any specific person, entity, group at any particular point in time. Plaintiffs essentially concede that the genesis of global warming is attributable to numerous entities which individually and cumulatively over the span of centuries created the effects they now are experiencing. Even accepting the allegations of the Complaint as true and construing them in the light most favorable to Plaintiffs, it is not plausible to state which emissions -- emitted by whom and at what time in the last several centuries and at what place in the world -- "caused" Plaintiffs' alleged global warming related injuries. Thus, Plaintiffs have not and cannot show that Defendants' conduct is the "seed of [their] injury." To the contrary, there are, in fact, a multitude of "alternative culprit[s]" allegedly responsible for the various chain of events allegedly leading to the erosion of Kivalina.

20. Overall, the District Court concluded that the chain of causation was far too weak between the injury and the impugned conduct; the claim for damages was "dependent on a series of events far removed both in space and time from the Defendants' alleged discharge of greenhouse gases".[37] The U.S. Court of Appeals affirmed the District Court's decision.

Urgenda Foundation v Kingdom of the Netherlands

21. The second case is ***Urgenda*** *Foundation v State of the Netherlands*,[38] which came to the *Hoge Raad*, the Supreme Court of the Netherlands, by way of *cassation*. The issue in *Urgenda* went to the heart of the Dutch Government's response to anthropogenic climate change: "whether the Dutch State [was] obliged to reduce, by the end of 2020, the emission of greenhouse gases originating from Dutch soil by at least 25% compared to 1990, and whether the courts can order the State to do so". Urgenda had sought orders directing the State to reduce GHG emissions so that, by the end of 2020, those emissions will have been reduced by 40%, or by 25% at least, compared to 1990. Urgenda was successful in the District Court, the Court of Appeal, and the Supreme Court.

22. *Urgenda* is notable in several respects. The first was the Supreme Court's consideration of two foundational questions: was international climate policy

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37 *Native Village of Kivalina v ExxonMobil Corp.*, 663 F. Supp. 2d 863 (N.D. Cal. 2009), 881-882.

38 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation).

binding upon the Dutch State under domestic law? And could the courts enforce an obligation so central to government policy-making? Both the District Court and the Court of Appeal answered those questions in the affirmative. On *cassation*, the Supreme Court found no error in the reasons of the courts below.

23. In a recurring theme of these cases, the State did not dispute the evidence of anthropogenic climate change.[39] The Court accepted the "high degree of [scientific] consensus that the warming of the earth must be limited to no more than 2°C" (revised to 1.5°C) and that "the concentration of greenhouse gases in the atmosphere must remain limited to a maximum of 450 ppm" (revised to 430 ppm),[40] as reflected in the Paris Agreement. The State also accepted that it was required to contribute to the emissions reduction commitments enshrined in the United Nations Framework Convention on Climate Change (**UNFCCC**). What it did dispute was whether Articles 2 and 8 of the *European Charter of Human Rights* (**ECHR**) required it to take those measures, and whether that meant ensuring that volumes of GHG emissions in the Netherlands were, by 2020, 25% less than it was in 1990.

24. The Supreme Court repeatedly emphasised the "joint responsibility of States" to tackle anthropogenic climate change, as well as the "partial responsibility of individual states".[41] This meant that States could be called upon to 'contribute' to reduce GHG emissions, because "each country is responsible for its part and can therefore be called to account in that respect".[42] The Court did not accept that States could unburden themselves of partial responsibility if others did not play their part, nor did it accept the defence that no action was needed if a country's

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39 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation), [4.1].

40 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation), [4.3].

41 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation), [5.7.1].

42 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation), 5.7.5].

share of GHG emissions is relatively small.[43] As a result, the Supreme Court found that Articles 2 and 8 of the ECHR "should be interpreted in such a way that these provisions oblige the contracting states to do 'their part' to counter" anthropogenic climate change.[44]

25. The Supreme Court emphasised that, within the Dutch constitutional system, decisions to reduce GHG emissions lie with the Government and Parliament, which are given significant discretion for political considerations.[45] it is up to the courts to decide whether the Government and Parliament have kept within "the limits of the law", which:

> 8.3.3 […] include those for the State arising from the ECHR. As considered in 5.6.1 above, the Netherlands is bound by the ECHR and the Dutch courts are obliged under Articles 93 and 94 of the Dutch Constitution to apply its provisions in accordance with the interpretation of the ECtHR. The protection of human rights it provides is an essential component of a democratic state under the rule of law.
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> 8.3.4 This case involves an exceptional situation. After all, there is the threat of dangerous climate change and it is clear that measures are urgently needed, as the District Court and Court of Appeal have established and the State acknowledges as well […].

26. The Court then considered the scope of the reduction required, having regard again to "high degree of consensus in the international community on the need for in any case the Annex I countries to reduce greenhouse gas emissions by 25% to 40% by 2020".[46] The Court found that the Dutch State was required to commit to the lower of the two amounts.[47]

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43 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation), [5.7.7].

44 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation), [5.8].

45 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation), [8.3.2].

46 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation), [7.2.7].

47 *Urgenda*, Supreme Court of the Netherlands (20 December 2019), case 19/00135 (English translation), [7.5.1].

27. While *Urgenda* may not be a causation case *stricto sensu*, its ideas of shared and partial responsibility have encouraged renewed action in Europe.

Milieudefensie

28. The third case is *Vereniging **Milieudefensie** & Ors v Royal Dutch Shell PLC*.[48] On 26 May 2021, the Hague District Court published its decision, ordering Royal Dutch Shell Plc (**RDS**)[49] to (among other things):[50]

> limit or cause to be limited the aggregate annual volume of all CO2 emissions into the atmosphere (Scope 1, 2 and 3) due to the business operations and sold energy-carrying products of the Shell group to such an extent that this volume will have reduced by at least net 45% at end 2030, relative to 2019 levels.

29. The proceeding was a class action brought by a Dutch association (together with other Dutch climate organisations, including Greenpeace) with the chartered purpose of contributing to the solution and prevention of climate problems and like aims. The claimants argued that RDS's failure to reduce its Scope 1, 2 and 3 emissions by 25-45% (relative to 2019) before 2030 would constitute an "unlawful act" towards them.[51]

30. The relevant legal obligation was said to be the "unwritten standard of care" (the "open norm" in Dutch tort law)[52] contained in Book 6, Section 162 of the *Dutch Civil Code*. The claimants argued that this obligation required RDS "to contribute to the prevention of anthropogenic climate change through the corporate policy it determines for the Shell group".[53]

31. In allowing the claim, the District Court dealt with standing (admissibility), choice

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48 *Rechtbank Den Haag*, *Milieudefensie and others v Royal Dutch Shell Plc*, Judgment of the Court of First Instance, 26 May 2021, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337).

49 The ultimate parent of the Shell Group since a 2005 restructuring.

50 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [5.3].

51 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [3.1].

52 Laura Burgers, "An Apology Leading to Dystopia: Or, Why Fuelling Climate Change Is Tortious" (2022) 11(2) *Transnational Environmental Law* 419, 429.

53 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [3.2].

of law, the source of the obligation, and the obligation itself and its enforceability. Causation was not separately examined, but there are references to, and assumptions made in respect of, causal connection throughout the judgment.

32. For example, causal connection was discussed at the applicable law stage. EU choice of law rules in Articles 7 and 4 of Rome II[54] require courts to locate the "event giving rise to damage".[55] RDS argued that the relevant event (or events) were "the actual CO2 emissions", which would then pick up "a myriad of legal systems"; the claimants submitted that the relevant event was "the corporate policy as determined for the Shell group by RDS in the Netherlands".[56] The District Court agreed with the claimants. What was significant was "that every emission of CO2 and other greenhouse gases, anywhere in the world and caused in whatever manner, contributes to" the "environmental damage and imminent environmental damage in the Netherlands and Wadden region", and "every contribution towards a reduction of CO2 emissions may be of importance".[57] RDS sought to downplay the significance of its policy-setting functions, arguing that its corporate policy was "a preparatory act that falls outside the scope of this article because in the opinion of RDS, the mere adoption of a policy does not cause damage."[58] The District Court rejected that argument as "too narrow" and not in line with "the characteristics of responsibility for environmental damage and imminent environmental damage" nor the law regarding Article 7 Rome II, which embraces "multiple events giving rise to the damage in multiple countries".

33. What is interesting about the District Court's interpretation of RDS's "reduction

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54 Regulation (EC) No 864/2007 of the European Parliament and the Council of 11 July 2007 on the law applicable to non-contractual obligations.

55 Article 7 Rome II determines that the law applicable to a non-contractual obligation arising out of environmental damage or damage sustained by persons or property as a result of such damage shall be the law determined pursuant to the general rule of Article 4 paragraph 1 Rome II, unless the person seeking compensation for damage chooses to base his or her claim on the law of the country in which the event giving rise to the damage occurred.

56 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.3.2].

57 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.3.5].

58 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.3.6].

obligation" (as flowing from the open norm) is that it entailed a multifactorial analysis ("an assessment of all circumstances of the case in question").[59] This closely mirrors the common law approach in Australia for determining when a duty of care applies.[60]

34. The Court considered several factors in its analysis, some of which are worth noting. *First*, the facts showed that RDS determined the general policy of the Shell group.[61] *Secondly*, the Court described the Shell group as "a major player on the worldwide market of fossil fuels" and is responsible for significant CO2 emissions globally, which exceed the emissions of many States, including the Netherlands.[62] These emissions contribute to global warming in the Netherlands. *Thirdly*, the District Court observed that, despite future uncertainty, if unabated climate change will likely cause serious and irreversible consequences for the Netherlands and, in particular, the Wadden region.[63] The District Court paid little regard to RDS's "adaptation strategies".[64] *Fourthly*, noting *Urgenda* and decisions of the UN Human Rights Committee, the District Court said that "dangerous climate change" affects and threaten the human rights in Articles 2 and 8 of the ECHR and Article 6 and 17 of the *International Covenant on Civil and Political Rights* (**ICCPR**).[65] *Fifthly*, the District Court took into account "soft law" instruments. The UN Guiding Principles (**UNGP**) and the *OECD Guidelines for Multinational Enterprises* outline the responsibilities of states and businesses in relation to human rights. While state responsibility is more "far-reaching than that of businesses",[66] the Court said that respect for human rights is a "global standard of expected conduct for all

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59 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.1].

60 James Allsop, *Climate Change and Legal Responsibility*, paper presented at the 4th Judicial Roundtable, Durham Law School, 26 April 2024, 23.

61 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.4].

62 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.5].

63 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.6]-[4.4.7].

64 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.8].

65 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.7].

66 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.12].

business enterprises wherever they operate".[67] Further, the Court recognised an "internationally propagated and endorsed need" for businesses (and so Shell) to take responsibility for Scope 3 emissions to the extent that (here) the Shell group or RDS, through policy, could control them. [68]*Sixthly*, the Court noted RDS's control over the Shell group, finding that "[t]hrough the energy package offered by the Shell Group, RDS controls and influences the Scope 3 emissions of the end-users of the products produced and sold by the Shell Group".[69] *Seventhly*, the Court observed that international agreements such as the Paris Agreement posit requires some share of the burden of anthropogenic climate change to be carried by non-State actors.[70] *Eighthly*, the Court recognized that the pathways for reduction were contained in various IPCC reports.[71] Based on all of these circumstances, the Court accepted that the relevant obligation recognises mutual dependencies and the need for global co-operation. It recognised that reaching net zero by 2050 necessarily requires co-operation by non-State actors. [72]

35. What then follows can only be described as a pronouncement of "attributable responsibility" (adopting Professor Wright's phraseology). While admitting that RDS did not itself cause the Scopes 1-3 emissions of the Shell Group, RDS remained "individual partially responsible" for the harm caused by the emissions of the Group (emphasis added):[73]

> It is an established fact that – apart from its own limited CO2 emissions – RDS does not actually causes [sic] the Scope 1 through to 3 emissions of the Shell group by itself. However, this circumstance and the not-disputed

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67 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.13].

68 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.21].

69 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.25].

70 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.26].

71 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.29].

72 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.34].

73 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.37]. See also [4.4.52] ("This issue, the not-disputed responsibility of other parties and the uncertainty whether states and society as a whole will manage to achieve the goals of the Paris Agreement, do not absolve RDS of its individual responsibility regarding the significant emissions over which it has control and influence" (emphasis added)).

> circumstance that RDS is not the only party responsible for tackling dangerous climate change in the Netherlands and the Wadden region does not absolve RDS of its **individual partial responsibility** to contribute to the fight against dangerous climate change according to its ability. As has been considered above […] much may be expected of RDS in this regard, considering it is the policy- setting head of the Shell group, a major player on the fossil fuel market and responsible for significant CO2 emissions, which incidentally exceed the emissions of many states and which contributes to global warming and climate change in the Netherlands and the Wadden region, with serious and irreversible consequences and risks for the human rights of Dutch residents and the inhabitants of the Wadden region.

36. After accepting that the open norm required RDS (and the Shell group) to contribute (partially) to the reduction of anthropogenic climate change, the District Court adopted the scientific consensus of the various reduction pathways to meet that standard, stating:[74]

> in formulating the corporate policy of the Shell group, RDS should take as a guideline that the Shell group's CO2 emissions (Scope 1, 2 and 3) in 2030 must be net 45% lower relative to 2019 levels.

37. By way postscript, we note that the Hague Court of Appeals overturned the District Court's decision on 12 November 2024. The Court of Appeal disagreed with the District Court's multifactorial assessment, finding that Shell did not have a "social standard of care" to reduce its emissions by 45% or any other amount,[75] despite acknowledging its duty to limit CO2 emissions in order to counter dangerous climate change.[76]

Sharma

38. The fourth case is *Minister for the Environment v* ***Sharma***,[77] a decision of the Full Federal Court (Allsop CJ and Wheelahan and Beach JJ). *Sharma* is the most

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74 *Milieudefensie*, C/09/571932/HA ZA 19-379 (ECLI:NL:RBDHA:2021:5337), [4.4.39].

75 *Gerechtshof Den Haag*, *Royal Dutch Shell Plc v Milieudefensie and others*, Judgment of the Court of Appeal, 12 November 2024, 200.302.332/01 (English translation), [7.111].

76 *Gerechtshof Den Haag*, *Royal Dutch Shell Plc v Milieudefensie and others*, Judgment of the Court of Appeal, 12 November 2024, 200.302.332/01 (English translation), [7.27].

77 *Sharma* (2022) 291 FCR 311.

fulsome investigation of causation in a climate-related case in Australia to date.

39. *Sharma* was commenced by six children, for themselves and other children they represented; they sought:[78]

    a. a declaration that a duty of care was owed by the Commonwealth Minister for the Environment to exercise her powers under sections 130 and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (**EPBC Act**) with reasonable care so as not to cause them harm; and

    b. an injunction restraining an apprehended breach of that duty when exercising her statutory discretion to approve a substantial extension of the Vickery Coal Project in northern New South Wales (**Extension Project**).

40. There was evidence that the Extension Project would result in: (i) a reduction of about 1 million tonnes (**Mt**) CO2 in "Scope 1" emissions, (ii) an increase of 0.15 Mt CO2 in "Scope 2" emissions, and (iii) an increase of 100 Mt CO2 in "Scope 3 emissions" over the Project term (compared to its initially approved form). (Pausing here: this language of Scope 1, 2, and 3 emissions is taken from standards developed by the World Business Council for Sustainable Development and the World Resources Institute.) Scope 3 emissions – the most significant source of emission for the Extension Project – are indirect (i.e. a consequence of the activities of a company, but which occur from sources not owned or controlled by the company). The relevant Scope 3 emissions referred to the ultimate combustion of coal extracted from the mine. At trial, the respondent Children contended that these emissions – the increase of 100 Mt of CO2 – would make a material contribution to future increases in the global surface temperature and thus the degree and magnitude of the risk of harm they faced.[79]

41. The Children were partly successful at first instance (obtaining a declaration, but

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78 *Sharma* (2022) 291 FCR 311, [104] (Allsop CJ).

79 *Sharma by her litigation representative Sister Marie Brigid Arthur v Minister for the Environment* [2021] FCA 560, [80] (Bromberg J).

not injunctive relief). On appeal, the Minister argued that the primary judge had erred in several respects; one of which was that he did not "have proper regard to the nature of the causal element bound up in foreseeability".[80] The harm had to be foreseeable, as distinct from "making", as the Minister argued, "a 'tiny' contribution to the condition that together with millions of other actors around the world might cause harm".[81] She contended that the harm caused by extending the mine – the 100 Mt of carbon dioxide combusted as a result of (increased) total coal extraction of 168 Mt[82] – was not reasonably foreseeable; instead "there could only be reasonable foreseeability of a tiny contribution to the overall risk of exposure to harm"[83] (emphasis added). According to the Minister, the primary judge implicitly accepted that the Minister's approval increased the risk of harm (the test for causation adopted by the House of Lords in ***Fairchild*** *v Glenhaven Funeral Services Ltd*[84] for asbestos cases, which is not the law in Australia), rather than one focused on the material cause of the harm (see ***Bonnington Castings*** *Ltd v Wardlaw*[85]).[86] The respondent Children did not rely on *Fairchild*, but embraced *Bonnington Castings* to submit that "any contribution to the harm (amid multiple conjunctive factors) above *de minimis* is material".[87] So, even though the relevant contribution might be "tiny", the harm could still be reasonably foreseeable: "each contribution to the accumulation of CO2 was a necessary (but not sufficient) cause of the accumulated whole that causes the harm".[88] The "tipping point" thesis was argued to be entirely consistent with *Bonnington Castings* in that (emphasis

80 *Sharma* (2022) 291 FCR 311, [181] (Allsop CJ).

81 *Sharma* (2022) 291 FCR 311, [181] (Allsop CJ).

82 *Sharma* (2022) 291 FCR 311, [19] (Allsop CJ).

83 *Sharma* (2022) 291 FCR 311, [308] (Allsop CJ).

84 *Fairchild* [2003] 1 AC 32.

85 *Bonnington Castings* [1956] AC 613.

86 *Sharma* (2022) 291 FCR 311, [181] (Allsop CJ).

87 *Sharma* (2022) 291 FCR 311, [200] (Allsop CJ).

88 *Sharma* (2022) 291 FCR 311, [200] (Allsop CJ).

added)[89]

> CO2 emissions will accumulate and contribute to the total atmospheric concentration of CO2 which drives the world towards a tipping cascade. If that cascade occurs, it was submitted that it will have been caused by all accumulated carbon, rather than any given (yet unidentifiable) emitter or emissions.

42. Setting aside the awkwardness of referring to one's judgment in the third person, we begin with the Chief Justice's reasons. *Sharma* was, in many ways, "unorthodox".[90] His Honour recognised that "[n]o harm has yet materialised. No relevant causal link to the harm has yet occurred" and "[t]he decision in question has the potential to make a 'tiny' […] contribution to a world-wide risk of catastrophic harm not only to the Children, but also to the world and humanity itself".[91]

43. His Honour examined causal connection (as an ingredient of reasonable foreseeability) and causation closely in a section titled "[f]oreseeability of contribution to risk and foreseeability of harm and causation",[92] reasoning that it would be erroneous "[t]o disaggregate the duty from causation and damage".[93]

44. We pause here to summarise the Chief Justice's discussion of the competing causation models. His Honour said that on no reading of the evidence, nor in the findings of the primary judge, could it be said that it was reasonably foreseeable that "but for" the decision and the likely release of the 100 Mt of CO2, the foreseeable harm would or may not occur.[94] But this (not unfamiliar) obstacle does not halt the causal inquiry: the "but for" analysis does not define causation.[95] The

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89 *Sharma* (2022) 291 FCR 311, [200] (Allsop CJ).

90 *Sharma* (2022) 291 FCR 311, [213] (Allsop CJ).

91 *Sharma* (2022) 291 FCR 311, [213] (Allsop CJ).

92 *Sharma* (2022) 291 FCR 311, [300]-[333] (Allsop CJ).

93 *Sharma* (2022) 291 FCR 311, [231]; see also [303] (causation was relevant at the duty stage, "not because it must be proved that damage was (or will be) caused by the breach, but because it was foreseeable that damage may be caused").

94 *Sharma* (2022) 291 FCR 311, [305] (Allsop CJ).

95 *Sharma* (2022) 291 FCR 311, [305] (Allsop CJ).

High Court in ***March*** *v E & M H* ***Stramare*** *Pty Ltd*,[96] and the reasons of Mason CJ (with which Toohey J and Gaudron J agreed) in particular, make clear that causation in the field of negligence is essentially a factual question, tested by common sense and experience, and one into which policy considerations and value judgments necessarily enter; however, the "but for" test is not definitive. Allsop CJ in *Sharma* mentioned three aspects of Mason CJ's judgment in *March v Stramare* which are worth re-stating. *First*, causation is part of the attribution of responsibility; it is not a philosophical or scientific inquiry.[97] *Secondly*, the law recognises concurrent and successive causes in the establishment of "material contribution" of the wrongful conduct to the injury: that is any contribution that is not de minimis.[98] *Thirdly*, Mason CJ recognised that value judgments are important to the causal question as part of the attribution of liability.[99]

45. After putting the "but for" analysis into context, the Chief Justice in *Sharma* then examined the competing "models or analogies" of causation in the case. The first was the *Bonnington Castings* "model" – advanced by the respondent Children – and its focus on ascertaining whether there was a material contribution to the harm.

46. In *Bonnington Castings*, the silica dust that caused the pursuer's pneumoconiosis came from two sources in his employer's factory: "innocent" dust from the pneumatic hammer at which he worked in respect of which no known practical method of extracting or preventing dust was available; and "guilty" dust from swing grinders that were fitted with an extraction device which was negligently not kept free from obstruction. The medical evidence permitted the conclusion that pneumoconiosis was caused by the gradual accumulation of silica dust inhaled (i.e. guilty and innocent dust together). The House of Lords accepted that

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96 *March v Stramare* (1991) 171 CLR 506.

97 *March v Stramare* (1991) 171 CLR 506, 509 (Mason CJ).

98 *March v Stramare* (1991) 171 CLR 506, 514 (Mason CJ) (citing *Bonnington Castings*, among other authorities).

99 *March v Stramare* (1991) 171 CLR 506, 515 (Mason CJ).

causation was proven, because the guilty dust was material in its contribution to the disease.[100]

47. The second was the House of Lords' more recent (and unanimous) decision in *Fairchild*, which permits causation to be proven if the relevant act increases the risk of harm to the plaintiff. The headnote[101] to the decision states (emphasis added):

> Where an employee had been exposed by different defendants, during different periods of employment, to inhalation of asbestos dust in breach of each defendant's duty to protect him from the risk of contracting mesothelioma and where that risk had eventuated but, in current medical knowledge, the onset of the disease could not be attributed to any particular or cumulative wrongful exposure, a **modified proof of causation was justified**; that in such a case proof that each defendant's wrongdoing had materially increased the risk of contracting the disease was sufficient to satisfy the causal requirements for his liability; an that, accordingly, applying that approach and in the circumstances of each case, the claimants could prove, on a balance of probabilities, the necessary causal connection to establish a defendant's liability.

48. This apparent clarity must be understood in the context of the strong disagreement in *Barker v Corus*[102] about what *Fairchild* did decide. At a minimum it can be said that each of their Lordships agreed that, in this case – where all of the defendants negligently increased the risk of disease, but none could be singled out definitively as the cause – it would be an affront to justice to require more than that increase in risk as the relevant causal or factual criterion of involvement upon which to found responsibility for compensation. The place of justice and fairness was both explicit and central in the reasoning of Lord Bingham,[103] Lord Nicholls,[104] Lord Hoffmann[105] and Lord Rodger.[106]

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100 *Bonnington Castings* [1956] AC 613, 618 (Viscount Simonds agreeing with Lord Reid), 621-623 (Lord Reid), 623-624 (Lord Tucker), 625-626 (Lord Keith of Avonholm).

101 Taken from the headnote in *Fairchild* [2003] 1 AC 32.

102 *Barker v Corus* [2006] 2 AC 572, between, in particular, Lord Hoffmann and Lord Rodger.

103 *Fairchild* [2003] 1 AC 32, 66 [33].

104 *Fairchild* [2003] 1 AC 32, 69 [40].

105 *Fairchild* [2003] 1 AC 32, 73 [56].

106 *Fairchild* [2003] 1 AC 32, 112 [155].

49. In *Sharma*, the Minister rightly identified that the *Fairchild* model of causation was impermissible, because of its lack of acceptance in Australia as a legitimate test for causation, at least until the High Court says otherwise. The Chief accepted this.[107]

50. Even so, the Minister had framed the causal aspect of reasonable foreseeability too narrowly, by arguing "that the emissions in question will increase the risk of harm by increasing in a small or tiny amount overall temperature denies […] the imposition of a duty".[108] Rather (emphasis added):[109]

> […] the real question for the imposition of the duty or not is whether the increase in risk of the harm from this act can be seen to be so small that it is not reasonably foreseeable, that is, it is not real but is fanciful, that the act will or may have any causal relationship to harm to the Children in the future.

51. The answer to this question turned on the expert evidence, which was not seriously disputed,[110] and which produced the following conclusion (emphasis added):[111]

> There is an approximately linear relationship between CO2 emissions and increases in the Earth's global average surface temperature in the absence of non-linear feedback effects. On the evidence, the best possible outcome for global warming is the stabilisation of the global average surface temperature at about 2°C above pre-industrial levels. To achieve this best possible outcome, based on a carbon budget analysis by Professor Steffen, no new coal mines, or extensions of existing coal mines (and one can suppose, the extension of this mine), can be approved. The approval of the extension of the mine would therefore cause 100 Mt of Scope 3 emissions likely to be emitted outside the available carbon budget for stabilising the average global surface temperature at 2°C above pre-industrial levels. Above 2°C of global warming, there is a small (but not zero) risk of non-linear feedback processes occurring which will accelerate global warming and which could trigger a tipping cascade, resulting in an irreversible 4°C future world. The risk of these tipping elements triggering a tipping cascade increases exponentially (or more rapidly) towards a "significant risk" as the global average surface temperature rises towards 3°C (or even lower) above pre-industrial levels. The frequency and severity of bushfires and

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107 *Sharma* (2022) 291 FCR 311, [320] (Allsop CJ).

108 *Sharma* (2022) 291 FCR 311, [328] (Allsop CJ).

109 *Sharma* (2022) 291 FCR 311, [329] (Allsop CJ).

110 *Sharma* (2022) 291 FCR 311, [330] (Allsop CJ).

111 *Sharma* (2022) 291 FCR 311, [331] (Allsop CJ).

> heatwaves, and therefore the risk of personal injury to the Children, increases as global average surface temperature increases.

52. Consequently, it could not be said that there was no reasonably foreseeable harm caused by the decision to approve the mine extension, because of the additional GHG emissions it would permit.[112] The purported duty could not be denied on that basis.[113] Ultimately it was for other reasons that no duty could be established and for which the Chief Justice allowed the appeal.[114]

53. Justice Beach also found that the purported duty of care did not exist. Like the Chief Justice, Beach J grappled with the appropriate model or analogy of causation. His Honour explained that the "tipping point" thesis – advanced as part of the expert evidence (and which was uncontested)[115] – meant that the 'material contribution' model in *Bonnington Castings* was unsuitable (emphasis added):[116]

> In *Bonnington Castings* the noxious dust was made up of two component sources, the totality of which was inhaled and caused harm. And in that context, the dust from the swing grinders was a material contribution to the disease. But in the case before us the indivisible condition which is said to cause harm is the temperature, not the CO2 emissions. Here the scope 3 emissions do not, with other emissions, directly cause the 4°C above the base line. Rather, the scope 3 emissions increase the likelihood or risk of producing the tipping point. And if that risk occurs, then there is a risk that the 4°C above the base line will occur.

54. Furthermore, the additional CO2 molecules caused by the "Scope 3" (i.e. indirect) emissions are unlike the harmful dust particles in *Bonnington Castings* ("The CO2 molecules themselves do not directly cause or contribute to harm").[117] *Fairchild* therefore offered a better analogy.[118] While *Fairchild* does not represent the law in Australia, the Court was only presently "concerned with reasonable foreseeability

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112 *Sharma* (2022) 291 FCR 311, [332] (Allsop CJ).

113 *Sharma* (2022) 291 FCR 311, [333] (Allsop CJ).

114 *Sharma* (2022) 291 FCR 311, [7] (Allsop CJ).

115 *Sharma* (2022) 291 FCR 311, [435] (Beach J).

116 *Sharma* (2022) 291 FCR 311, [435] (Beach J).

117 *Sharma* (2022) 291 FCR 311, [436] (Beach J).

118 *Sharma* (2022) 291 FCR 311, [436] (Beach J).

and not causation".[119]

55. His Honour then made a valuable "suggestion": referring to "the NESS (necessary element of a sufficient set) test advocated by Professor Richard Wright and others", which is useful "when dealing with a posited causal condition that is neither necessary nor sufficient".[120] His Honour cited this passage from the learned Professor:[121]

> Moore acknowledges the validity and usefulness of the NESS account's ability to identify as causes conditions that were neither strongly necessary nor independently strongly sufficient, while also noting and criticising the consequent increased proliferation of causes. David Fischer also objects to the proliferation of causes and questions the validity of recognising trivial contributions as causes – eg, a teaspoon of water added to a flooding river or a match added to a raging forest fire. Yet the teaspoon of water and the match contributed to and are part of the flood and forest fire, respectively. What if the same flood or fire were caused by a million (or many more) different people all contributing a teaspoonful of water or a single match? Denying that any of the teaspoonfuls or matches contributed to the destruction of the property that was destroyed by the flood or fire would leave its destruction as an unexplained, non-caused miracle. As a pure matter of causation, it cannot possibly matter whose hands supplied the different bits of water, flame or fuel. What is driving the intuition of no causation is the judgment regarding attributable responsibility, which is especially brought to mind if the question is posed as 'Did the teaspoon of water or match destroy the property?' rather than 'Did the teaspoon of water or match contribute, even if only extremely minimally, to the flood or fire that destroyed the property?' What is generally agreed upon is that the trivial contributor should not be held liable when her contribution was trivial in comparison to the other contributing conditions and was neither strongly necessary nor independently strongly sufficient for the injury at issue, but this is a normative issue of attributable responsibility rather than causal contribution.

His Honour also referred to Professor Jane Stapleton's contributions on this topic and test "that 'a factor is a factual cause if it contributes in any way to the existence of the phenomenon in issue'".[122]

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119 *Sharma* (2022) 291 FCR 311, [436] (Beach J).

120 *Sharma* (2022) 291 FCR 311, [438] (Beach J).

121 *Sharma* (2022) 291 FCR 311, [438] (Beach J) (citing Wright, "The NESS Account of Natural Causation: A Response to Criticisms" in R. Goldberg (ed.) *Perspectives on Causation* (Hart Publishing, 2011), 304-305.

122 *Sharma* (2022) 291 FCR 311, [439] (Beach J) (citing Stapleton, "Factual Causation" (2010) 38 *Federal Law Review* 467, 475-477).

56. By referencing this work, Beach J demonstrated how a "factual causation" inquiry can mask a (moralising) process of "attributable responsibility"; *Sharma* raised similar issues. His Honour had no need to determine the causation question, but observed that "[i]t seems to me that the common law is going to have to evolve to deal with scenarios such as the present, including adopting such considered suggestions to deal with factual causation".[123] In any case, the primary judge's conclusion on reasonable foreseeability was "sustainable".[124] Like Allsop CJ, Beach J dismissed the appeal for other reasons.

57. As for Wheelahan J, his Honour also concluded that the asserted duty of care could not be established. Like Allsop CJ and Beach J, Wheelahan J said that reasonable foreseeability invites "attention to questions of causation".[125] His Honour then discussed the causation scenarios examined elsewhere in the Full Court's reasons, but, distinct from *Bonnington Castings* and *Fairchild*, described a fourth scenario (emphasis added; citations omitted):[126]

> where there are multiple contributing causes by persons not acting in concert, **none of which alone would be sufficient to cause injury, but which in combination cause the injury alleged**. Again, this scenario involves proof on the balance of probabilities that each cause contributed to the damage. The fourth scenario includes cases where the alleged tortfeasor's contribution to the damage, though positive, was unnecessary by itself to contribute to a threshold point at which the damage was sustained, to which Stapleton refers in her articles cited below as "the over-subscribed case". The issue to which the fourth scenario gives rise is that no single contributing cause would satisfy the "but for" test, which at common law is an important negative criterion of causation […]

58. His Honour noted that causal connection could be explained by *Fairchild* or this "fourth scenario," though this did not represent the law in Australia and raised "significant consequential issues". [127]

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123 *Sharma* (2022) 291 FCR 311, [440] (Beach J).

124 *Sharma* (2022) 291 FCR 311, [441] (Beach J).

125 *Sharma* (2022) 291 FCR 311, [872] (Wheelahan J).

126 *Sharma* (2022) 291 FCR 311, [879] (Wheelahan J).

127 *Sharma* (2022) 291 FCR 311, [882] (Wheelahan J).

Smith v Fonterra

59. The fifth case is *Smith v Fonterra*,[128] which was decided in February 2024. This appeal came to the Supreme Court of New Zealand following a strike out of a claim in tort for damage caused by anthropogenic climate change. The Court of Appeal held that the claim was bound to fail. The Supreme Court disagreed. A key question for the public nuisance claim on appeal was whether there was a sufficient connection between the pleaded harm and the activities of the respondent GHG emitters and suppliers (in other words, or causation).[129]

60. The respondents argued that the "range and diffuse and disparate causes" of anthropogenic climate change "exceed the capacity of the common law for response".[130] The Supreme Court was less pessimistic about the common law's "capacity" (emphasis added):[131]

> Another assessment, that might arise after the benefit of evidence and a full trial, may be that climate change is different in scale, but a consequence of a continuum of human activities that may or may not remain lawful depending on whether the harm they cause to others is capable of assessment and attribution.

61. Conceding that the common law has not grappled with a global crisis like anthropogenic climate change, the Court recognised that this problem is not entirely unfamiliar. In the 19th and early 20th century, common lawyers had to respond to "another existential crisis, albeit one of lesser scale, when the industrial revolution dramatically enlarged the risk of accidents through the mechanisation of factories, transportation and mining".[132] The law's response was sometimes "flawed" (e.g. the common employment rule restricting claims by employees for injury), and sometimes "inspired" (e.g. the duty of care based on neighbourhood, expounded by Lord Atkin in *Donoghue v Stevenson*). Importantly, if the response

128 *Smith v Fonterra* [2024] NZSC 5.

129 *Smith v Fonterra* [2024] NZSC 5, [115].

130 *Smith v Fonterra* [2024] NZSC 5, [155].

131 *Smith v Fonterra* [2024] NZSC 5, [155].

132 *Smith v Fonterra* [2024] NZSC 5, [156].

of the common law was flawed, the legislature stepped in (e.g. as it did with establishing statutory workers' compensation schemes). There was also a new, widespread risk caused by air and water pollution and the escape of biohazards, again which demanded the courts' response.[133] The difference is that "[c]limate change engages comparable complexities, albeit at a quantum leap scale enlargement."[134]

62. Ultimately, the Court did not need to resolve the causation question – that required "evidence and policy analysis exceeding that available on a strike out application" – but the respondents could not be eliminated as parties until "these difficult but fact- and policy-driven questions have been resolved by full trial and (potential) appeal".[135]

Verein

63. The sixth case is ***Verein*** *KlimaSeniorinnen Schweiz and Others v Switzerland*,[136] which was decided in April 2024. There the European Court of Human Rights (**ECtHR**) held, by a majority of sixteen votes to one, that there had been: a violation of Article 8 (right to respect for private and family life) of the ECHR; and, unanimously, that there had been: a violation of Article 6(1) (access to court). The proceedings arose out of a complaint made by four women and a Swiss association, Verein KlimaSeniorinnen Schweiz, whose members are all older women who "described how their health and daily routines were affected by heatwaves" caused by climate change.[137] The applicants' complaints were directed at failures by the Swiss authorities to mitigate climate change – in particular, the effects of global warming, including a lack of access to a court in

133 *Smith v Fonterra* [2024] NZSC 5, [157].

134 *Smith v Fonterra* [2024] NZSC 5, [157].

135 *Smith v Fonterra* [2024] NZSC 5, [166].

136 *Verein*, European Court of Human Rights, Grand Chamber, Application No 53600/20, 9 April 2024.

137 *Verein*, European Court of Human Rights, Grand Chamber, Application No 53600/20, 9 April 2024, [10].

that regard – and relied on Articles 2, 6, 8 and 13 of the ECHR.[138]

64. The Court found that Switzerland had failed to comply with its Convention obligations. While accepting the "margin of appreciation" given to States, these obligations were said to require each Contracting State to undertake measures to achieve a substantial and progressive reduction of their respective GHG emission levels, with a view to reaching net neutrality, in principle, within the next three decades.[139] Switzerland's domestic regulatory framework was found to be deficient in several respects. For example, the Swiss authorities had failed to:[140]

> (a) adopt general measures specifying a target timeline for achieving carbon neutrality and the overall remaining carbon budget for the same time frame, or another equivalent method of quantification of future GHG emissions, in line with the overarching goal for national and/or global climate-change mitigation commitments;
>
> (b) set out intermediate GHG emissions reduction targets and pathways (by sector or other relevant methodologies) that are deemed capable, in principle, of meeting the overall national GHG reduction goals within the relevant time frames undertaken in national policies[.]

65. Switzerland had also failed to meet its past GHG emission reduction targets.[141] While appreciating the wide discretion given to national authorities to implement legislation and measures, the Court held, on the basis of the material before it, that the Swiss authorities had not acted promptly and in an appropriate way to devise, develop and implement relevant legislation and measures in this case.

66. In respect of causation, the Court adopted a *Fairchild*-like analysis in accepting, in respect of Article 8, that it covered actual harm and "sufficiently severe risks" of harm (emphasis added):

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138 *Verein*, European Court of Human Rights, Grand Chamber, Application No 53600/20, 9 April 2024, [291].

139 *Verein*, European Court of Human Rights, Grand Chamber, Application No 53600/20, 9 April 2024, [548].

140 *Verein*, European Court of Human Rights, Grand Chamber, Application No 53600/20, 9 April 2024, [550] and [562].

141 *Verein*, European Court of Human Rights, Grand Chamber, Application No 53600/20, 9 April 2024, [558]-[559].

435. As the Court has already recognised, Article 8 is capable of being engaged because of adverse effects not only on individuals' health but on their well-being and quality of life […] and not only because of actual adverse effects but also sufficiently severe risks of such effects on individuals […]. The Court has already established that Article 8 may apply in environmental cases whether the pollution is directly caused by the State or whether State responsibility arises from the failure to regulate private industry properly (see, for instance, *Hatton and Others v. the United Kingdom* [GC], no. 36022/97, § 98, ECHR 2003-VIII). It has also held that the duty to regulate not only relates to actual harm arising from specific activities but extends to the inherent risks involved (see, for instance, *Di Sarno and Others v. Italy*, no. 30765/08, § 106, 10 January 2012). In other words, issues of causation must always be regarded in the light of the factual nature of the alleged violation and the nature and scope of the legal obligations at issue.

436. In sum, on the basis of the above findings, the Court will proceed with its assessment of the issues arising in the present case by taking it as a matter of fact that there are sufficiently reliable indications that anthropogenic climate change exists, that it poses a serious current and future threat to the enjoyment of human rights guaranteed under the Convention, that States are aware of it and capable of taking measures to effectively address it, that the relevant risks are projected to be lower if the rise in temperature is limited to 1.5oC above pre-industrial levels and if action is taken urgently, and that current global mitigation efforts are not sufficient to meet the latter target.

67. The Court seemed to admit that causal standards might be relaxed in climate change cases[142] (emphasis added):

439. In the context of climate change, the particularity of the issue of causation becomes more accentuated. The adverse effects on and risks for specific individuals or groups of individuals living in a given place arise from aggregate GHG emissions globally, and the emissions originating from a given jurisdiction make up only part of the causes of the harm. Accordingly, the causal link between the acts or omissions on the part of State authorities in one country, and the harm, or risk of harm, arising there, is necessarily more tenuous and indirect compared to that in the context of local sources of harmful pollution. Furthermore, from the perspective of human rights, the essence of the relevant State duties in the context of climate change relates to the reduction of the risks of harm for individuals. Conversely, failures in the performance of those duties entail an aggravation of the risks involved, although the individual exposures to such risks will vary in terms of type, severity and imminence, depending on a range of circumstances. Accordingly, in this context, issues of individual victim status or the specific content of State

142 *Verein*, European Court of Human Rights, Grand Chamber, Application No 53600/20, 9 April 2024, [439].

obligations cannot be determined on the basis of a strict conditio *sine qua non* requirement.

Finch

68. The seventh (and final) case is the UK Supreme Court's decision in *R (on the application of **Finch** on behalf of the Weald Action Group) v Surrey County Council & Ors*,[143] decided in June 2024.

69. This was a planning permission case, in which the **developer**, Horse Hill Developments Ltd, had sought development consent from Surrey County **Council** to retain and expand an existing oil well site and drill four new wells (**Project**); this would enable the production of hydrocarbons from six wells over a period of 25 years.[144] Before giving its consent, the Council was required to apply the *Town and Country Planning (Environmental Impact Assessment) Regulations 2017* (**2017 Regulations**), which mandated an "Environmental Impact Assessment" (**EIA**) in respect of the Project. The 2017 Regulations had themselves implemented *Directive 2011/92/EU of the European Parliament and of the Council, as amended by Directive 2014/52/EU* (**EIA Directive**). Article 3(1) of the EIA Directive required the EIA to describe and assess the "direct and indirect […] effects of a project".

70. The Council advised the Developer that its EIA should assess the climactic effect of the Project, and "consider, in particular, the global warming potential of the oil and gas that would be produced by the proposed well site."[145] The Developer disregarded this recommendation: its EIA only assessed the Project's direct GHG emissions (i.e. only Scope 1 emissions were assessed) and did not assess combustion (or Scope 3) emissions.[146] The Council relented and accepted the

143 *Finch* [2024] UKSC 20.

144 *Finch* [2024] UKSC 20, [31] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

145 *Finch* [2024] UKSC 20, [33] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

146 *Finch* [2024] UKSC 20, [34] and [43] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

EIA.[147] As a result, no information about the Scope 3 emissions was made public or considered before development consent was given in September 2019. The claimant – who represented a local climate action group – sought judicial review of the Council's decision. They were unsuccessful at first instance and in the UK Court of Appeal. The issue for the Supreme Court was "whether, under the EIA Directive and the 2017 Regulations, it was lawful for the council not to include the combustion emissions in the EIA for the proposed project."[148]

71. Lord Leggatt (with whom Lord Kitchin and Lady Rose agreed) answered that question in the negative and allowed the appeal. The Council's decision was unlawful, because (i) the EIA failed to assess the effect on climate of the combustion of the oil to be produced, and (ii) the Council's reasons for disregarding this effect were flawed

72. For his Lordship, the key question – which focused on the "effects of a project" – was 'obviously' "a question of causation" (since "[a]n effect is the obverse of a cause".)[149] In that analysis, Lord Leggatt had little trouble establishing factual causation, given the "overwhelming scientific proof of [anthropogenic climate change] demonstrating the past, present and likely future effects on climate of, among other human activities, burning fossil fuels to generate energy." [150] In addition to the "understanding of human behaviour and other knowledge about the world", "scientific knowledge" was important to determining causation.[151]

73. After reviewing different models of causation, Lord Leggatt found one especially compelling. Using the language of "necessary and sufficient conditions", he said that (emphasis added): [152]

147 *Finch* [2024] UKSC 20, [37] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

148 *Finch* [2024] UKSC 20, [52] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

149 *Finch* [2024] UKSC 20, [66] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

150 *Finch* [2024] UKSC 20, [65] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

151 *Finch* [2024] UKSC 20, [65] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

152 *Finch* [2024] UKSC 20, [80] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

> On the agreed facts, the extraction of the oil is not just a necessary condition of burning it as fuel; it is also sufficient to bring about that result because it is agreed that extracting the oil from the ground guarantees that it will be refined and burnt as fuel.

74. This – combined with the "wide causal reach"[153] of Article 3(1) – meant that Scope 3 emissions had to be considered[154] (at least for crude oil, compared to other commodities)[155] and it was therefore wrong to confine the scope of the EIA.

75. Finally, Lord Leggatt questioned whether local planning authorities, in deciding whether to grant planning permission, are unsuited or ill-equipped to assess the potential contribution of a mineral extraction project to climate change[156] (i.e. essentially large question of national policy). He said these arguments are misguided and proceed from a misguided premise:[157]

> Of course, the authority must have regard to national policy; and in so far as UK national policy requires great weight to be given to the benefits of petroleum extraction, in particular for the economy, that must be taken into account. But it does not follow that the planning authority has to ignore adverse effects on climate of a proposed project or adopt an interpretation of what constitute such adverse effects which is contrary to reality.

76. Further, the meaning and scope of the EIA Directive could not be controlled by reference to UK policy and legislation; not just because national policies, of EU Member States (or non-Member States) are usually irrelevant to the interpretation of EU law, but also because there remains an obligation to conduct an EIA.[158] Separately, it is important a project that is likely to have significant adverse effects on the environment is authorised with the full knowledge of those consequences,[159] even if "economic, social and other policy factors will outweigh

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153 *Finch* [2024] UKSC 20, [83] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

154 *Finch* [2024] UKSC 20, [83]-[92] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

155 *Finch* [2024] UKSC 20, [119]-[124] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

156 *Finch* [2024] UKSC 20, [140] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

157 *Finch* [2024] UKSC 20, [150] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

158 *Finch* [2024] UKSC 20, [151] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

159 *Finch* [2024] UKSC 20, [152] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

environmental factors in many instances."[160]

77. These reasons should be compared to those of Lord Sales (with whom Lord Richards agreed), who would have dismissed the appeal. The penultimate paragraph encapsulates his Lordship's reasoning (emphasis added):[161]

> As Lord Bingham pointed out [in *Brown v Stott* [2003] 1 AC 681 at 703], [the ECHR] had to be interpreted according to its terms, not in an effort to produce a remedy for every problem which might be identified in a particular situation. So, in the present context, the EIA Directive, interpreted according to its terms, has a valuable role to play in relation to mitigating greenhouse gas emissions associated with projects for which planning permission is sought, but it should not be given an artificially wide interpretation to bring all downstream and scope 3 emissions within its ambit as well. <u>That has not been stipulated in the text of the EIA Directive, is not in line with its purpose and would distort its intended scheme.</u>

78. In short, neither the purpose or scheme of the EIA Directive, nor the text itself, indicated that the "indirect effects of a project" extend to combustion or Scope 3 emissions. Lord Sales admitted that "limited assistance" could be derived from the jurisprudence of the Court of Justice of the European Union and domestic case law.[162]

79. His Lordship also recognised that the "profound" consequences of the appellant's broad interpretation of the EIA Directive underscored the limitations of the Directive; those consequences would:[163]

> not [be] limited to the extraction of oil, since, for instance, the production of aircraft would involve the manufacture of components in a number of factories, leading to the construction of an aircraft in another, and its eventual use for transportation, with greenhouse gas emissions produced at each stage. If it had been intended that the EIA for a factory project to produce components should include all the downstream emissions, this would have been set out clearly in the EIA Directive.

80. Lord Sales also made the point that '"big picture' issues" – such as decisions

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160 *Finch* [2024] UKSC 20, [153] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

161 *Finch* [2024] UKSC 20, [332] (Lord Sales; Lord Richards agreeing).

162 *Finch* [2024] UKSC 20, [296] (Lord Sales; Lord Richards agreeing).

163 *Finch* [2024] UKSC 20, [271] (Lord Sales; Lord Richards agreeing).

regarding the distribution of GHG emissions between different sectors and balancing and promoting different national economic objectives – are all "big picture" issues which a local planning authority such as the Council "is simply not in a position to address in any sensible way".[164] There is much force, we think, in that view.

81. Finally, an interesting aspect of his Lordship's examination of the causation question is that, in his view, the text of Article 3(1) – which focused on the effects "of the project" – implied "that the effects must be relatively closely connected to the project and do not qualify if they are too remote" (emphasis added).[165]

E. Causation's hard cases

82. As the cases above make clear, there are several different models or 'tests' (test is a problematic word: always think twice before use) for causation that could be applied to assessing the harms of anthropogenic climate change. The first is the standard "but for" analysis. Lord Legatt said in *Finch*[166] that the but for test is "generally seen as a weak test of causation because, in any given situation, many events (or states of affairs) will satisfy the "but for" test which would not usually be regarded as causes of the event under consideration". Whether that is an entirely helpful encapsulation of the but for test, we will leave. Positing that it would not have happened but for the posited event or action may be a not easy standard. The second, and a weak test for causation, is the *Fairchild* model: whether the relevant acts materially increased the risk of harm. The third test for causation is the *Bonnington Castings* model: i.e. whether the relevant acts materially contributed to the harm. A (weaker) variation of this – Wheelahan's "fourth scenario in Sharma" – was described by McHugh J in *Henville v Walker*:[167]

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164 *Finch* [2024] UKSC 20, [253]-[255] (Lord Sales; Lord Richards agreeing).

165 *Finch* [2024] UKSC 20, [276] (Lord Sales; Lord Richards agreeing).

166 *Finch* [2024] UKSC 20, [68] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing) (citing *Financial Conduct Authority v Arch Insurance (UK) Ltd* [2021] AC 649, [181]).

167 *Henville v Walker* (2001) 206 CLR 459 at [106]

> If the defendant's breach has "materially contributed" [citing Bonnington Castings] to the loss or damage suffered, it will be regarded as a cause of the loss or damage, despite other factors or conditions having played an even more significant role in producing the loss or damage. As long as the breach materially contributed to the damage, a causal connection will ordinarily exist **even though the breach without more would not have brought about the damage**. In exceptional cases, where an abnormal event intervenes between the breach and damage, it may be right as a matter of common sense to hold that the breach was not a cause of damage. But such cases are exceptional.

83. The fourth model – "[t]he strongest possible test of causation, which is seldom satisfied when questions of causation arise in law" – requires the occurrence of event X to be both a necessary and sufficient condition for the occurrence of Y.[168] As explained in *Finch*: "If X is a sufficient cause of Y, then every time X happens Y will always follow. This is the kind of unbreakable connection that exists, for example, where laws of physics, such as Newton's laws of motion, operate."[169]

84. Any one of these models, or some other, might offer an answer to the causation question. But the cases examined above show just how important it is to justify a causal model (for the harms or risks of anthropogenic climate change) that can satisfy both logic and the law.

85. Over these tests or models are principles of context or approach. An example is the precautionary principle, where the consequences are so serious that a low threshold is required for preventative action.

86. We posit that the answer lies in the law's handling of causation's 'hard cases'. This label covers a broad range of issues, like the scope of liability in negligent misrepresentation cases,[170] the degree of the required causal connection necessary to be proved in respect of the acquisition of a disease of uncertain aetiology,[171] or in respect of damage subsequent to a failure to warn of risk,[172] or

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168 *Finch* [2024] UKSC 20, [69] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

169 *Finch* [2024] UKSC 20, [69] (Lord Leggatt; Lord Kitchin and Lady Rose agreeing).

170 *South Australia Asset Management Corp v York Montague Ltd* [1997] AC 191.

171 *Fairchild* [2003] 1 AC 32.

172 *Chappel v Hart* (1998) 195 CLR 232; *Rosenberg v Percival* (2001) 205 CLR 434; *Chester v Afshar* [2005] 1 AC 134.

the extent of recoverability for increased risk of harm,[173] or loss of a chance.[174] All of these cases defy simple common sense (or a cause-in-fact/cause-in-law dichotomy); rather, in each of these cases, the criteria for liability that was selected reflected cogent legal policy considerations, not intuitive moral judgements. That is to say, these cases were dictated less by internal responses than (external i.e. not common sense) legal doctrine (recognised and accepted ex ante, well before the dispute in question).

87. Legal policy aside, we suggest that courts might come closer to answering this particular hard case if they can resolve other foundational questions. *Firstly*, what is the content of the asserted duty or obligation? *Secondly*, is this a case of actual or threatened harm? And, *thirdly*, what is the relief sought?

88. It is problematic, at least in the realm of negligence, when those three questions are 'disaggregated'. This was not lost on the Full Court in *Sharma*.[175] Disaggregation of the obligation, breach, and causation is problematic for several reasons, not least because while causation is generally backwards-looking, the question of reasonable foreseeability has, as Beach J noted in *Sharma*, a forward-looking dimension.[176] And if the relief sought includes an injunction – as was sought in *Sharma* – then causation will require some apprehension of future harm (i.e. it is also forward-looking). One very recent example of a forward-looking causation exercise is *Finch* (dictated there by the terms of the relevant obligation in the EIA Directive).

89. Our point is that the causation exercise will adjust according to the obligation and relief sought. This is no more or less than a reflection of the law's dynamism; here, its capacity to establish distinct rules of responsibility for past and future harm. Once understood, causation's 'hard cases' are less daunting. The place of relief

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173 *Tabet v Gett* (2010) 240 CLR 537; *Gregg v Scott* [2005] 2 AC 176.

174 *Sellars v Adelaide Petroleum NL* (1994) 179 CLR 332.

175 See e.g. *Sharma* (2022) 291 FCR 311, [295] (Allsop CJ), [538] (Wheelahan J).

176 *Sharma* (2022) 291 FCR 311, [415] (Beach J).

and context is important. The injunction will be important as always, though; especially the possibility of injunctive relief in an appropriate case. Where development may be particularly crucial, is in the conditioning of injunctions and the strength or relevance of the proposition that the court will not supervise its orders.

F. The attribution science

90. We must say something about that efflorescent sub-field of climate science, known as "attribution science", which makes the bold claim that GHG emissions can be traced to individual companies.

91. For example, one influential study from 2014 analysed the historical fossil fuel and cement production records of the top 50 investor-owned, 31 state-owned, and 9 nation-state producers of oil, natural gas, coal, and cement from 1854 to 2010.[177] The paper claimed to have traced GHG emissions totalling 914 GtCO2e (i.e. 63% of cumulative worldwide emissions of industrial CO2 and methane between 1751 and 2010) to those 90 entities.[178]

92. The author, Richard Heede, analysed company production records from publicly available annual reports, company websites, company reports filed with the U.S. Securities and Exchange Commission, company histories, and other sources.[179] Nothing is said about the quality of these records. The annual coal, oil, and gas productions of each entity were then apparently converted into emissions using IPCC, UN, International Energy Agency (**IEA**), and U.S. Environmental Protection Agency (**EPA**) carbon factors.[180] The author's model accounted for non-combustion uses of hydrocarbon products (e.g. petrochemicals, lubricants, road oil, waxes, and solvents); these non-combustion uses were then subtracted from

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177 Richard Heede, "Tracing anthropogenic carbon dioxide and methane emissions to fossil fuel and cement producers, 1854–2010" (2014) 122(1)-(2) *Climatic Change* 229.

178 Heede (2014) 234.

179 Heede (2014) 231.

180 Heede (2014) 231.

emission calculations.[181] The model also accounted for the carbon content of each fuel (which determines the amount of CO2 released upon combustion). The author conceded some averaging for coal, because most producers say little about heating values or the rank of coal mined, even though the carbon content for most coal varies (from around 33 % carbon for lignites to around 72 % carbon for anthracites).[182] The model also included additional emissions from CO2 venting during raw (sour) natural gas processing, CO2 from gas flaring, and fugitive or vented methane from oil and gas operations and coal mining.[183] These emission rates were derived from IPCC Tier 1 factors and cross-checked against EPA data on CO2 and CH4 leakage, flaring, and venting rates, flaring data from the World Bank , and coal mine methane venting rates using data from U.S. and international sources.[184]

93. Researchers have attempted to extend Heede's work. For example, in 2017, researchers (Ekwurzel et al.) published a climate model which claims to quantify the anthropogenic climate change contributions of the historical (1880-2010) and recent (1980-2010) emissions traceable to Heede's 90 producers.[185] In particular:

> Emissions traced to these 90 carbon producers contributed ~57% of the observed rise in atmospheric CO2, ~42–50% of the rise in global mean surface temperature (GMST), and ~26–32% of global sea level (GSL) rise over the historical period and ~43% (atmospheric CO2), ~29–35% (GMST), and ~11–14% (GSL) since 1980 (based on best estimate parameters and accounting for uncertainty arising from the lack of data on aerosol forcings traced to producers).

94. In very simple terms, this climate model incorporates the Heede (2014) data for emissions traced back to carbon producers to calculate increases in global surface temperature – adjusting for intermittent volcanic eruptions and historical fossil fuel

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181 Heede (2014) 232.

182 Heede (2014) 232.

183 Heede (2014) 232.

184 Heede (2014) 232.

185 Ekwurzel et al., "The rise in global atmospheric CO2, surface temperature, and sea level from emissions traced to major carbon producers" (2017) 144 *Climatic Change* 579.

aerosols – which is then used to predict changes in global sea levels.[186] In a 2019 paper, researchers published the results of a model, claiming that emissions traced to the 88 largest carbon producers over two periods (1880-2015 and 1965-2015) have contributed around 55% and 51%, respectively of the historical decline in surface ocean pH levels.[187]

95. Litigants have leapt onto this attribution science to bolster their claims. For example, in May 2023, Greenpeace began proceedings in the Civil Court of Rome against the Italian energy major, ENI S.p.A., the Italian Ministry of the Economy and Finance and the Cassa Depositi e Prestiti S.p.A (the Italian Development Bank owned by The Ministry of the Economy and Finance). Section 17 of the Summons describes the conclusions of "attribution science" in reconstructing the contribution (and thus responsibility) of individual companies for climate change:[188]

> To come to ENI, its cumulative CO2 and CH4 emissions over the period 1988-2015 amount to 0.6% of global cumulative industrial emissions (Heede, 2014). The database on which the work of Ekwurzel et al. (2017) is based makes it possible to attribute to ENI over the period 1980-2010: 1) between 0.309 and 0.395 ppm contribution to the increase in the concentration of CO2 in the atmosphere; 2) between 0.0013 and 0.0037 °C contribution to the increase in the global mean land temperature; and 3) between 0.04 and 0.21 mm global sea level rise. The database of the study by Licker et al. (2019) shows that over the period 1980-2015, ENI contributed to ocean acidification, reducing the pH of the oceans by between 0.000365 and 0.000444.

96. The claims of the so-called attribution science are clearly ambitious, but the real question is whether they should have any role in supplying the link between GHG emissions and the harms of anthropogenic climate change. Sir Owen Dixon provides an answer.

97. On 30 September 1933, his Honour delivered a paper to the Medico Legal Society

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186 Ekwurzel et al. (2017) 583.

187 Licker et al., "Attributing ocean acidification to major carbon producers" (2019) 14(2) *Environmental Research Letters* 124060.

188 Writ of Summons dated 9 May 2023 (*Greenpeace Italy et. Al. v ENI S.p.A., the Italian Ministry of Economy and Finance and Cassa Depositi e Prestiti S.p.A.*, Civil Court of Rome) 44.

of Victoria in Melbourne. The paper is titled, "Science and Judicial Proceedings", and was published in *Jesting Pilate*. His Honour had observed that the Courts had created a compelling (yet flawed) conceptual framework for examining causation, in which the investigation of cause was essential. He noted that the complexification of modern life forced that framework to its limits (emphasis added):

> In the simpler conditions of social life prevailing when causation grew into importance as a standard of legal right, perhaps the difficulties of answering the question it propounds were not great. Before the mechanical and scientific age, the sources of inquiry were either relatively simple, or else entirely outside human knowledge. But science, particularly physical science, has completely changed the practical application of the legal tests. […] Where the rough and ready answers of the practical man might have once sufficed, an exact and reasoned solution is now called for. […]

98. But his Honour nonetheless recognised the importance of judges being both willing and capable of testing scientific evidence. There are several reasons why. The first is that, if care is not taken, expert evidence can smuggle in answers to the ultimate question of law, which should be left to the judge. This point was made by Lord Justice Auld in his *Review of the Criminal Courts of England and Wales*,[189] who criticised the tendency of experts to give opinion evidence "masquerading as expert evidence on or very close to the factual decision that it is for the court to make". The second is that the scientific or technical expert does not approach his or her art in the same way as the judge does with the law; expert opinions frequently call for intuitive judgment based on anterior knowledge and lived experience, which allows the expert witness to draw inferences from particular facts, sometimes by unarticulated steps in inductive reasoning, abstracting from the most general assumptions to specific conclusions.[190] The third reason, related to the second, is that the expert witness and his or her peers have a common store of knowledge, a common language, which brings the expert (and her opinions)

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189 Robin Auld, *A Review of the Criminal Courts of England and Wales* (2001) 574, [133].

190 Justin Gleeson, "The judge, the advocate and the expert witness - revisiting the seminal views of Sir Owen Dixon in the modern context" (2016) 48(4) *Australian Journal of Forensic Sciences* 366, 368.

closer to her peers, and further away from the language of the law.[191] In an article published in *The Australian Journal of Forensic Sciences* in 2016, Justin Gleeson SC drew on these points of Sir Owen and cited the work of Professor Deirdre Dwyer and German sociologist, Niklas Luhmann, who argued that modern civic communication is comprised of a number of autopoietic social systems, which are self-sufficient, self-contained, self-referential and largely communicating only with themselves about the world. In modern parlance, this is an 'echo chamber' problem. The fourth reason concerns the independence of the expert. In *Miller Steamship Co Pty Ltd v Overseas Tank Ship (UK) Ltd*,[192] Walsh J (as his Honour then was) observed that "unconscious bias […] is a well-known characteristic of expert evidence". Similarly, in *Stoleson v United States of America*,[193] Judge Posner said that "there is not much difficulty in finding a medical expert witness to testify to virtually any theory of medical causation short of the fantastic". This concern is not unique to climate science, but it should be kept in mind, especially when only one of the parties leads expert evidence, which, for whatever reason, is not contested.

99. As far as climate-related litigation is concerned, several of the cases examined above demonstrate that some parties, particularly States, have hesitated to test the claims of climate science and its assumptions. This puts Courts in an invidious position; especially appellate courts, which are heavily reliant on the factual findings – especially uncontested factual findings – made below. This issue was not lost on Beach J in *Sharma* (emphasis added):[194]

> 368 There were some unusual features about how the forensic case was run before the primary judge, not the least of which concerned the expert evidence before his Honour dealing with the effect of greenhouse gas (GHG) emissions on average global surface temperatures through until at least 2100. First, only one expert was called, being Professor William Steffen for the respondents.

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191 Gleeson (2016) 368.

192 *Miller Steamship Co Pty Ltd v Overseas Tank Ship (UK) Ltd* (1963) 63 SR (NSW) 948, 963 (Walsh J).

193 *Stoleson v United States of America* (7th Cir 1983) 708 F.2d 1217, 1222.

194 *Sharma* (2022) 291 FCR 311, [368]-[370] (Beach J).

> There was no witness served up by the Minister. Second, the Minister chose not to cross-examine Professor Steffen on any topic.
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> 369 In my view, all of this was unsatisfactory given that there was one aspect of the science that appeared to be contentious concerning the tipping point hypothesis and the non-linear effects of GHG emissions when temperature reached 2°C above the relevant base line. One might have expected there to have been multiple experts produced on both sides going to this question, but the Minister chose a different strategic pathway and eschewed any meaningful technical presentation before the primary judge.
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> 370 Of course, it may have been an appropriate course for the Minister not to challenge the central tenets of the projections of the Intergovernmental Panel on Climate Change (IPCC), particularly as they concerned various representative concentration pathways and their potential or likely consequences. Indeed many publications of the Commonwealth, its agencies and statutory authorities have confirmed or re-inforced such work and analysis. But in terms of Professor Steffen's tipping point analysis at or around 2°C above the base line, that seems to have been, at least for the Minister, a contentious area. So much was demonstrated by the Minister's submissions before us. But at trial, none of this was forensically challenged or the subject of a competing forensic case.

100. These comments demonstrate the importance of testing the claims of climate science and especially the conclusions of attribution science (still in its infancy). One solution might be for courts to, for example, appoint contradictors or independent experts, or grant leave to *amici curiae* and interveners to appear; doing so might ensure that the scientific claims of anthropogenic climate change can be stress-tested in a manner familiar to (and safe-guarded by) the judicial process. While each mechanism serves a distinct purpose,[195] they are utilised, ultimately, to assists courts in establishing adjudicative facts and producing just outcomes. We note that contradictors, in particular, have been used to great effect in class action litigation; they have been appointed to assist courts by evaluating settlement approval applications and representing the interests of group members. Done properly, a contradictor can ventilate important issues related to approving a settlement, which might not otherwise be raised by the parties (e.g. the appropriateness of certain costs and commissions).[196] Courts could adopt similar

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195 See e.g. *Bolitho v Banksia Securities Ltd (No 6)* (2019) 63 VR 291, [78] (John Dixon J); *Priest v West* (2011) 35 VR 225, [30] (Maxwell P, Harper JA and Kyrou AJA).

196 Eugenia Levine and Julia Nikolic, "The Role of Contradictors in Class Action Litigation", Victorian Bar (Paper, 31 August 2022) <https://www.barristers.com.au/wp-content/uploads/2022/11/22-08-31-Paper-CPD-Contradictors-in-class-action-litigation.pdf

methods to ensure that, as Beach J noted in *Sharma*, “contentious” expert evidence is “forensically challenged or the subject of a competing forensic case”.

G. Conclusion

101. In this paper we revealed the different assumptions that underpin our analysis of causation in climate-related cases; namely, the role of the judiciary, how the scientific consensus of anthropogenic climate change should be approached, and the recognition that Australian courts can expect, whether they like it or not, more climate-related litigation. These assumptions underline the importance of giving judges the tools they need to adjudicate these claims in a manner consistent with the role and responsibilities of judicial power. We examined comparative judicial approaches to causation in climate-related cases, in order to identify the various ways in which this problem has been approached by different courts. We also provided a framework for examining causation’s ‘hard cases’, and demonstrated how the causal inquiry might adjust depending on answers to legal policy and certain basal questions; this should affect how causation is approached for proof of the harms related to anthropogenic climate change. We then considered the ‘attribution science’ and argued that Australian courts should shy away from testing these scientific claims (or the claims of climate science more broadly), especially when one or more of the parties chose not to contest these claims themselves. We say none of this to encourage or detract from climate-related litigation, but so that courts can resolve such cases logically and justly.

102. In a paper on causation in commercial law in 2010,[197] one of us concluded a detailed discussion of causation by saying that the apparent growing willingness of the courts to adapt rules for responsibility and liability reflected a declining influence of formalistic reasoning and analytical jurisprudence of a century ago, with an absence of Benthamite derision of justice and morality. Both have their part to play with utility in the binding of society through loyalty to the rule of law.

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197 James Allsop, *Causation in Commercial Law*, paper presented at the "Torts in Commercial Law Conference" Sydney, 17 December 2010, 85-86.

Rigour of analysis does not drive out, but complements notions of justice. As Beverley McLachlin once said in an article referenced in the causation paper to which we just referred: the law of torts (and indeed the law generally) is concerned with righting wrongful conduct.[198] Self-evident wrongs that cannot be recognised or dealt with by the law's rules may reasonably leave people with a sense of injustice. A legitimate sense of injustice should not be the product of the rule of law.

103. This throws up the careful parameters of the judiciary. Its deeply important protective power is built on trust; that the judiciary will not arrogate the proper power of those called upon by the democratic process to govern: the Parliament and the Executive. To do so would risk corrosion of that trust.

104. Likewise, however, a failure to engage in the rightful judicial task of principled development of the law as it adapts to the movements in society's context and reality, risks the law being seen as unable to participate in its rightful protective function, and is reduced accordingly.

14 November 2024

198 Beverley M McLachlin, "Negligence Law – Proving the Connection" in Nicholas J Mullany and Allen M Linden (Eds), *Torts Tomorrow: A Tribute to John Fleming* (1998).